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Canada.  
Ministry of State, Science and Technology

Speech







# SPEECH

from the Minister of State  
for Science and Technology  
the Hon. John Roberts

Government  
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## Notes for an Address

by

The Honourable John Roberts

to the

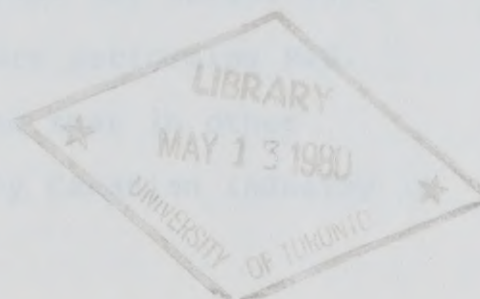
Canadian Association

of

University Research Administrators

Ottawa

May 5, 1980



Minister of State

Science and Technology  
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one of the lowest, and thus the need for increased R&D the highest. The Government has developed a number of policies and programs to aid in this. Also, the Government is developing other industrial policies that should help create opportunities for Canadian industry.

Our universities are an essential element in the total national R&D effort. Without a strong, viable university research community, we will not have access to the latest technology; we will not develop the bright, creative minds that are so crucial to healthy science; and we will not be able to tackle the increasingly complex and urgent problems which concern us as a nation.

The Government wishes to ensure that the university research sector can fulfill the potentials it offers. It has encouraged the Granting Councils to come forward with five-year plans, and these present an opportunity to provide stability to the research community, to generate the momentum necessary for effective research and to permit researchers to pursue the more long-term, broadly-based studies which tend to be ignored in an uncertain budgetary climate. I am pleased to tell you today that the Government has affirmed the increase in the 1980-81 budget of the Natural Sciences and Engineering Research Council of \$41.8 million, raising the budget to a total of \$162.6 million. That is an increase of 35 percent over last year.



I understand that NSERC will be allocating a substantial share of this increase to new training programs to attract the best of our young people into post-graduate research. These new awards will be available in both university and industry and should promote an improved transfer of technology and highly-trained people to industry.

The NSERC funds will support other important objectives as well: they will strengthen the base of research competence that I spoke of earlier; there is provision for replacement of obsolete equipment; and the Council's strategic research programs in areas of national concern will be expanded.

The increases in the 1980-81 budgets of the other two Councils as they appear in the Estimates are: an MRC budget of \$82.2 million which is a rise of 17 percent and a SSHRC budget of \$41.7 million which is a rise of 16 percent. The longer term budgets of the three Councils will be assessed in the context of total financial requirements by the Government over the coming years.

The budget increases for the Councils are only part of the Government's total R&D expenditure increase for 1980-81. The total increase in R&D in the natural sciences, including the NSERC increase, is \$155 million. This is a very significant advance - a great step forward. It still constitutes a significant commitment in these periods of budget constraint. Nevertheless I will be working for a greater financial commitment; I believe that an expenditure close to \$190 million would be the appropriate one and I am relatively confident that further increases in the government's commitment for the year 1980-81 will take place. Some of the highlights of the present increased expenditure commitments in addition to the NSERC Council increases are: \$9 million for the Anik-C and Anik-D satellite programs; \$10 million for renewable energy and conservation measures; \$19 million for the Enterprise Development Program of IT&C; and \$4 million for the operation of the TRIUMPH facility at the University of British Columbia.

There are two further issues which concern the universities and which I would like to touch upon briefly. The first is the federal-provincial relationship with regard to the support for university research. In the provinces, science and technology is receiving increased attention. Provincial research councils have been created, discovery and



other industrial research parks are springing up in several places. Financing is improving through the use of oil and lottery revenues, particularly for medical research. All this points to a marked increase in the provincial participation in R&D and I welcome it. However, it should not be interpreted as, in any way, diminishing the federal role in supporting R&D, and in particular its support of university research. I believe strongly that it is the Federal Government's responsibility to ensure that national goals and objectives are defined and pursued in the universities and elsewhere. For example, our R&D target only makes sense if there is an adequate highly qualified manpower base and, as I said earlier, we look to the universities as the major source of this manpower. This need not represent an adversarial position vis-à-vis the provinces. I believe, though, that it means that we must improve the means for consultation and coordination between the two levels of government. I would welcome the opportunity to discuss with my provincial counterparts university research and industrial technological development as they relate to both national and provincial interests.

The second issue relates to Canada's requirements for highly-qualified manpower (HQM). The 1.5 percent target has significant implications for HQM especially in the applied sciences and engineering as well as business administration and management. Studies by my Ministry suggest that a target of 1.5 percent by 1985 would imply a potential shortfall of research-trained personnel of between 3,000 and 4,000, largely in the applied fields of study.

In addition to the R&D thrust, there are other developments in the Canadian economy that will result in increased HQM personnel requirements. These include energy projects such as the one at Cold Lake, Alberta; work associated with the new fighter plane contract; opportunities for Canada in electronics and communications technology as well as new industries coming out of the biotechnological revolution. As the level of industrial R&D increases, an employment spin-off effect would occur as new products and processes move through development into production. This will result in additional requirements for HQM in the applied sciences, engineering and administration, and will exacerbate the supply shortfall associated with the target.



It is evident, therefore, that the R&D target, and the associated industrial activity related to increased R&D together with other special factors (energy, communications, biotechnology etc.) will all contribute to high levels of requirements for HQM during the 1980's.

The Science Council in its report "University Research in Jeopardy" has pointed to real problems of supply. The size of the 18-24 age group will shrink by about 20 percent by the end of the decade, due to the sharp decline in the birth rate during the 1960s. It is expected that the university age group will not start to increase again until the mid-1990s. During the 1980s, therefore, the university system will be under pressure. There will likely be fewer students qualified to enter postgraduate study, reduced mobility of faculty, and few new appointments. Budgets will be constrained by lower enrolments and a more senior academic salary structure. The need to consolidate and rationalize university programs and facilities will become more urgent. Existing organizational rigidities may make adaptation difficult. Thus at a time when there are increasing demands on the universities, the university system is entering a period of instability and restraint.



I fully expect that as university research administrators you will do all in your power to see that research in the universities does not suffer through these difficult times.

Science and technology are bringing about many changes in Canadian society - our communications system, our food system and our energy supply, for example are undergoing rapid transformation. Enormous opportunities are also being presented for our creative talent in economic, social and cultural endeavours. The universities educate and train many of these key people and through the five year plans of the Councils and in other ways the federal government will give the encouragement and support that is needed to turnaround our R&D picture. The government is committed to raising the R&D consciousness of Canada. It is a time for a concerted effort amongst the policy makers, the scientists, the industrialists, the administrators and the managers to make the right choices about the direction and effectiveness of that increased R&D effort.

I want also to re-emphasize that we believe in the maintenance of a strong national science policy - one which is directed to achieving important objectives for our country.



This will be accomplished more easily if we can join our efforts with those of others, specially the provinces. We are anxious to consult with them. We believe that federal and provincial efforts can usefully complement one another, but we certainly have no intentions to abandon our efforts to meet the overall scientific needs of Canada.







from the Minister of State  
for Science and Technology  
the Hon. John Roberts



GOVERNMENT AND SCIENCE

"BRIDGING THE FRONTIERS OF SCIENCE AND PUBLIC POLICY"

Speech Notes

THE HONOURABLE JOHN ROBERTS

MINISTER OF STATE FOR SCIENCE AND TECHNOLOGY

AND MINISTER OF THE ENVIRONMENT

for the meeting of

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

(AAAS)

Toronto, Ontario

January 4, 1981



Minister of State

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My official task is to welcome you on behalf of the government of Canada, and to wish you well in your deliberations. I would like to add my personal greetings and best wishes. We are glad to see you in my home city of Toronto, and in our country.

The American Association for the Advancement of Science plays a special role within the scientific community. But its influence extends far beyond the world of science to industry, to government - indeed to every aspect of our society.

As the Minister of the Canadian government responsible for science policy, I would like to speak to you for a little bit of that larger relationship -- of science to society, and especially of the furthering of science through government policy.

Undoubtedly the purpose of science is knowledge. But the value of science lies in its enhancement of human society.

Surely the over-riding reason for scientific enquiry is, simply, that which can only be described as improved humanity. Indeed, the value of science is in the constant search to improve the quality of life - to satisfy our curiosity, to improve our health, our wealth and our capacity to pursue meaningful activity. In that sense, the cause of advancing science - understanding the world around us - is a noble one. It has been, and continues to be, a driving force in our civilization.

And yet exactly this "humaneness" of science -- its fitness for human purposes, has often been contested -- and is so today. To many,

science is a sorcerer's apprentice -- visiting upon the world consequences often unwanted and side effects incalculable.

The classic expression of this fear of science -- perhaps I should say the romantic expression -- is found in Mary Shelley's "Frankenstein", that metaphor for the monstrous product of rational science unleashed upon the moral world. "Frankenstein", I suspect, is more responsible than any thing else for that conventional mad view of the "mad" scientist -- one sees it carried on in Dr. Jeckyl and Mr. Hyde and, in our own day, of course, in the character of Dr. Strangelove.

These fictional representations do capture, of course, some of our essential schizophrenia towards science -- our longing for its benefits coupled with a fear of its unknown consequences.

In a generation for which the legacy of science has been not only, say, interplanetary exploration, heart transplants and polio vaccine, but, as much, the atomic bomb, napalm and D.D.T. it is the capacity of science to destroy, as much as the capacity to serve, which has impressed, especially the young, in our society.

Perhaps I am more conscious of this scepticism of science than most of my Cabinet colleagues. I wear two hats in Cabinet - Minister for Science and Technology, and Minister of the Environment.

In my latter capacity, I have become increasingly conscious of the risks associated with the exploitation in technology of scientific



advance. Recently, for instance, we have become increasingly sensitive to the problems caused by Dioxins in the environment. Our scientific methods of detection have now become so sophisticated we can detect minute quantities of Dioxin in the Great Lakes -- more accurately in Gulls' eggs -- than ever before. Unfortunately our capacity to understand the significance of these tracings of Dioxin lags far behind our capacity for detection. We know Dioxin is the most powerful poison known to humanity. In short, we have sufficient knowledge to scare the hell out of the public without being able to explain the effects of our detection. What we are sure of, however, is that our society has created the phenomenon of Dioxins without having thought through -- without knowing -- all of the consequences of our exploitation of what science has made possible.

The way to hell is paved with good intentions. In the 1960's, science and technology told us we could avoid local devastation in smelting centres by building tall smoke stacks to dissipate the smoke and smog effects of production processes.

What we created instead of local impact was the long range distribution of acidic substances -- in short, acid rain.

Acid rain is, without a doubt, the most pressing environmental concern for Canadians. Almost 80% of our people are aware of the problem, so the demand for action is great. As you know, acid rain is caused by the emission of  $\text{SO}_x$  and  $\text{NO}_x$  into our atmosphere. Twelve million tons of these chemicals are being dumped as precipitation on eastern Canada every year. The effects on our forests and our lakes is,

quite simply, disastrous. The number of lakes, for example, which are dead or dying is in the many thousands. The potential economic impact on our forestry and fishing industry and to tourism is in the billions.

The problem with acid rain is not our lack of knowledge. It is true that we still have much to learn. That is why the Canadian government has increased its acid rain research budget by 41 million dollars over the next 4 years. But we know enough to know that action is required immediately.

Nor is our problem not knowing how to reduce the emissions. We have the technology today which would enable us to combat acid rain effectively.

The problem is one of costs -- of the priority for the allocation of financial resources and the balance of social costs -- the problem, in the final analysis, is one of political will. In Canada, governments are acting to impose tighter standards for emission levels. Just three weeks ago, for example, the Canadian Parliament unanimously passed an amendment to the Clean Air Act which deals with the Long Range Transport of Air Pollutants. We are moving to reduce emissions from Canadian Industry. We are committed to this course of action.

But, acid rain is an international phenomenon. Pollutants do not respect international boundaries. Even if we were able to eliminate completely our own polluting sources, we would still be receiving airborne more than 6 million tons of these chemical pollutants from sources in the United States -- six million tons which today's



technology could reduce to safe levels.

In short, we are frustrated in our efforts in Canada by the simple fact that at least half of the problem stems from sources outside our jurisdiction. Acid rain is a striking paradigm for so many of our environmental problems. Its scope is international. Its causes are scattered in a variety of countries. Its consequences extend far beyond national boundaries. And its successful resolution will require co-operative international action.

That is why we press so often -- and in every way we can discover -- for the United States to take effective action against acid rain. We ask -- not for charity, nor even altruism -- but only for enlightened self-interest. For the acid rain which eats away at our environment goes on to wreak havoc in the eastern United States. And indeed, its scope and impact is there increasing.

United States sources estimate its costs in building erosion alone as up to \$4 billion of damage each year.

And yet -- bizarrely -- rather than combatting the dangers, we are likely to intensify them. In our obsession with cheaper energy -- and the conversion of coal for energy needs in the United States -- without the implementation of environmental safeguards, we risk meeting short term energy objectives at long term costs which are staggering.

You might think I am making a plea, that I am begging the A.A.A.S.,

with so many American members, to concern themselves with the problem, to lobby United States political figures to make them sensitive to these problems.

You would be entirely correct. I am appealing to you -- to enlightened scientific knowledge, to the A.A.A.S., -- to bring home to the United States public the long term consequences in economic and social costs, of short term benefit policies which savage the environment.

I know you are concerned about these issues. I was pleased to see that acid rain and environmental concerns are the subject of several of your meetings. But we still have a long way to go in public education on these issues.

I have spoken particularly about acid rain. I could have spoken of toxic chemicals, of the ozone layer, of chlorofluorocarbons -- the issue remains the same. Environmental problems caused by our modern technology, essentially international in nature, cry desperately for co-operative international action.

And we must cease exploiting science carelessly. I do not, of course, mean that we must stop fulfilling the opportunities that science provides us with. But we need a consistent, collective effort over the long term -- to assess fully the consequences of innovation before it proceeds. Such an effort would diminish the adverse consequences of badly applied science and the expensive crash programs needed to rectify these consequences once they materialise and get out of hand.



One example of an area where this approach is clearly necessary is in the use of toxic chemicals.

If we are to dissipate the scepticism in our society about science, we must seriously undertake the task of de-mystification of science. Public suspicion, of indifference, or inadequate interest -- on an individual basis -- often manifests itself in three forms. The individual often says that science doesn't directly affect him, and therefore he should not have to be concerned about it. Second, even if the individual acknowledges that science affects him, as other individuals, he maintains that science is too complex and that he can't understand it. The third view is that even if science does affect individuals and that they are capable of some basic understanding of science, they certainly can't influence in any meaningful way the direction of science as it affects them.

In essence, I believe that it is the scientific community that must convince the public that science -- and the issues of science -- are both germane and comprehensible; that science, or knowledge, can respond to the values and needs of our society; and that it is not necessarily inhumane, or threatening, nor beyond the control of society's purposes; but that it will respond to the direction an intelligent society gives to it.

Scientists have an obligation not as scientists, but as citizens, to explore and to explain the social consequences of what it is they do.

Of course the scepticism shown toward science and its practitioners,

is hardly unique in our society. Politicians, I am frequently reminded, come very low in public esteem. I am sure that there are more mothers who want their children to grow up to be scientists than want them to grow up to be politicians.

But the misprizing of science and scientists, the misunderstanding of science and scientists, ought to be, I believe, a matter of serious concern -- both because science will become increasingly important to our society (it is, ultimately, the only means by which we can overcome the declining marginal productivity of capital within our economy), and because the establishment of policies of government support for the promotion of science will depend upon a public understanding, or at least a public acceptance, of the crucial importance of science to human progress.

There is no need to stress that the relationship between science and society is symbiotic. A society which is not committed to the development and application of new knowledge is doomed to decline. That is why science and technology in the current context is so tremendously crucial.

I confess, immediately, that I have no magic wand to create this public understanding -- but I do have a couple of modest suggestions.

One I have already touched upon. It is that scientists must explain -- must consider it important to explain -- what it is they do and relate it to the social context of their activities. I know from my own years in university the dread disdain that attaches to the word



"populariser". Yet we desperately need more people who can talk to the public about science, and its impacts, in ways which make it understood.

I salute the efforts of some people in this area -- in my country for instance, the CBC and David Suzuki, the Toronto Globe & Mail and its science articles -- in Britain the Economist and its attempts to render science and technology comprehensible.

But more scientists must get involved in this work of explanation. To be absent is to be wrong. Unless scientists care enough to explain what it is they do, to understand and respond to its social consequences public support for what they do will be minimal. A science which is not understood, which does not serve society and be seen to serve it, is unlikely to receive the kind of public financial support which it needs. This, too, is an area which is receiving significant attention in your deliberations at this convention.

Government, too, has greater obligations in this area of communication to the public. The Science Council of Canada, recently, has undertaken a study of how best to educate and inform the public of the role of science in our society. It has come forward with useful suggestions. I hope very much that, with government support, we shall soon be able to support science information programs that will put in perspective, and relate to social utility, the science activities in our country.

Even more important government must create a solid base of support, in a continuing way over long-term planning periods, for scientific activity.

Today, science is a co-operative effort on a major scale. The necessity of specialization has made inter-disciplinary activity essential. The costs for supporting this work have required extensive intersectoral co-operation among business, industry and government. International collaboration and exchange, made possible through developments in communication and transportation, have also become facts of life in a world where economic and technological interdependency has flourished.

Science and technology has become a huge, complicated and far-reaching activity. Increasingly, the notion of independent and individual scientific enquiry is submerged by national science priorities or national research strategies.

It has long been accepted that the primary role for government in this area has been to support what is called basic or fundamental research. In this country where there has not been a large number of privately funded research institutions, that function is almost entirely located in our universities and the National Research Council. In Canada we recognize basic research as a priority.

But we are now grappling in Canada with defining a national science policy beyond simply the support of basic research.



Of course the exploitation of science, and application of technology, has always been a major factor in our country's life. The basic national objectives of establishing a comprehensive transportation system and a modern communications network have been a basic impulse in Canada since before 1867. (Indeed, some historians would argue that Canada is the only country to have been established in order to implement the possibilities of modern technology -- that is, build a railroad.)

The use of knowledge to maintain and strengthen this sprawling territory in the northern half of North America has been continual. Research in agriculture to make the 6% of our land mass which is arable productive, research in resource based industries, research into new energy technologies are simple examples of the over-all research efforts needed to maintain our competitiveness.

But much of that effort has been ad hoc, undertaken through a process of unplanned incrementalism.

More recently we have attempted to think through a more coherent approach to government's support of science policy.

In the first instance to establish levels of expenditure -- as a percentage of G.N.P. -- for both the government and non-government sectors. We recognize that the current level of expenditure in Canada, just under 1% of G.N.P., is far below what it should be, and we are determined to raise our expenditures to 1.5% by the mid 1980's.

In fact our expenditures in government on science and technology have greatly increased over the past year.

Secondly, we have attempted to establish in government our priorities for the support of basic research in universities, governmentally directed research in departments, and support for research in departments, and support for research in the private sector. I hope to be outlining at much greater length later in the month what our planning time-table on expenditures and priorities will be for the next five years.

While the government can do its part, and should, I confess, do it better than it has in the past, we shall require a greatly expanded research effort in the private sector if we are to meet our goals.

But above and beyond this necessary establishment of general priorities and the allocation of resources, is the establishment of the economic sectors in which our over-all effort -- government, universities, and the private sector -- should concentrate. We cannot thin our resources to be active in every research field -- we must concentrate on those where Canada has an accumulated expertise, or natural competitive advantages, or special problems and opportunities.

The definition of these sectors of concentration seems to me to be a crucial step in the elaboration of a national science policy -- or more broadly, our entire research and development policy. The choosing of economic sectors to support seems to me to be at the heart of an industrial policy.



I see that policy in terms of general objectives and a common-sense approach of flexibility in program implementation. For example, it would seem to me that any industrial policy for Canada, thus a science and technology policy for Canada's future should include, at least, the following elements:

First, we must recognize that our economy is still essentially resource-based -- in food, energy, forests and minerals -- and that we must use science and technology as a means of maintaining and enhancing our competitive edge in the exploitation of those resources.

Second, we must expand our resource orientation by applying the common-sense principle of processing our resources where that would be most efficient -- close to the resource base. Thus a major objective of industrial policy would be to encourage the development of secondary and tertiary resource-based industry where the particular resource is found.

Third, we must provide continued support for high-technology industry with proven markets or solidly demonstrated potential. The size of our market, and the extent of our financial resources means that Canadians cannot keep pace with the latest technology in every area. So we must direct our support to those activities where we have acknowledged expertise, or promising export potential.

Fourth, we must make a special effort to foster very new emerging technologies in which Canada clearly has a unique capability. While the full scope of the application of these technologies may not be

fully comprehensible until their maturity, the potential long-term economic and social dividends are so considerable as to warrant careful nurturing of these technologies in their infancy. Our expertise with the artificial production of insulin as an area of the newest of these revolutionary technologies -- biotechnology -- is an excellent example.

Finally, we must capitalize on the major opportunity for scientific and technological spin-offs from the large scale projects Canada will be undertaking over the next decade. We must maximize the opportunities created by tar-sands development, modernization of our transportation system and expansion of our pipeline network, for example. The more than 200 billion dollars which will be invested in these projects can reap benefits for Canadians for decades.

I am optimistic that we can meet our research and development objectives in Government. But that accomplishment will be relatively insignificant unless the universities and private sector are able to expand their present efforts considerably.

We know that there are handicaps in our efforts to have, in particular, the private sector play a greater role in our national research and development effort. One of these handicaps is the predominance of resource activity in the Canadian economy, as opposed to manufacturing. Another is the small size and fragmented nature of our national market.

Another and important handicap is the high degree of foreign ownership in Canada. Our data shows that multinationals operating in



Canada typically expend less of their resources on research and development than comparable Canadian firms. Even then, a great part of those resources are spent, not in product development and improvement, but in research on marketing and product promotion. It should not be surprising that this is the case, given the capacity for research and development in the parent companies beyond our border. Canada does indeed benefit from imported technologies. But on balance, and given the increasingly competitive world market, it is our judgement that this situation is not a healthy one for the longer term. Our response is not to chase away foreign investment but to encourage a re-shaping of its role in the Canadian economy. In our view, the concept of world product mandating, already being successfully employed by some foreign companies, offers a partial answer. In this way, all of the functions related to a specific product line, from research and development right through to export marketing, are handled by one of its branch operations.

Another difficulty being experienced in Canada is that our great number of small and medium sized industries do not have enough capacity to support an in-house R and D effort. It has thus become the role of government to introduce policies and incentives to provide alternate research support by facilitating the transfer of technology from government and university laboratories to industry.

Finally, scientific and technological developments have greatly altered and expanded our skilled manpower needs. The job of meeting those needs is perhaps the most important medium-term challenge our governments face in response to the advance of science.

In Canada, although we have far to go, some indicators for R and D expansion in private industry are encouraging. A recent survey of Canadian firms by the Financial Post indicates that they intend, on average, to increase their investment in R and D to keep pace with international competition. The development of new energy sources, vigorous programs in research-intensive industries like telecommunications and new investments in our mining industries, are all factors contributing to this trend. But we still have a long way to go.

The government's performance is improving. Despite the overall context of government restraint and the commitment to reducing our national deficit, we have chosen to stimulate R and D. The hard evidence of this commitment is reflected in the increase of some two hundred million dollars of funds approved for R and D by the government in fiscal year 1980-81. This amount represents an increase of 19% in the government's R and D expenditures over 1979. The government's effort, in fact, exceeds the R and D expenditures required as its share of the national R and D effort for 1980, which puts us on the critical path to achieving the 1.5% target by the mid 1980's. The effects of this expenditure will be reinforced by the increased R and D spending by industry. While much remains to be done, the trend is there. The government is committed to delivering on the R and D front.

Clearly, for any country, scientific policy, in our age of specialization and high capital costs, must be rooted in a context of society's objectives expressed through the processes of government and politics.



And equally clearly, politicians and scientists are going to have to understand each other, and I would hope, get along with each other.

No doubt it will be difficult.

Our points of departure are so different.

To the scientist, I would guess, the ultimate question is "What is true and how can I establish that it is true?"

To the politician, the question often is, as John Kennedy once put it -- "Will it work, will it help, will it pass?"

I hope no one will accuse me of holding that scientists are paragons of truth and politicians cynical opportunists. I have been a politician for a long time, and hold that profession in esteem -- an "honourable adventure" John Buchan once called it.

It is rather that politicians are called upon to deal with problems which are not like puzzles or questions, to which there are definitive and singularly correct solutions. They deal rather -- though many would be reluctant to admit it -- with values, with how our science resources of people, time and money, should be allocated to achieve social ends. And these ends are not definitive. They shift as the attitudes and concerns of the electorate change, sometimes as a result of the leadership of political figures -- often in spite of the leadership of political figures.

Ultimately, politics deals with public acceptability -- it is a response to the jumble, often a contradictory one, of the needs and desires of the society it represents.

What will be required, more acutely in the future is a mutual understanding of these views. Scientists will have to understand that science policy exists not simply to support scientists in their intrepid voyages of discovery into the unknown, but springs from a context of politically defined social needs. Politicians must understand that the concerns and achievements of science will, almost inevitably, lead to areas of decisions in which his skills of political judgement are, at best, of limited help.

What will be most needed is a system of planning which brings these two aptitudes -- those of the scientist and those of the politician -- closer together early in the planning process. One of the ways we have sought to do this in Canada is through the establishment of scientific task forces in areas which we believe to be of special importance to our country. The first of these has been established in the area of biotechnology. Others will be established once we have had an opportunity to assess the results of this first initiative.

One question which we must consider, I believe is how the Science Council of Canada can be used to strengthen the contribution of scientists to policy formulation in its initial stages.

And perhaps the most significant challenge to us is to find better methods for planning longer term expenditures in science. Government



budgets are determined not simply by the necessary provisions of financial resources to achieve program objectives. They are continually adjusted to meet the needs of economic stabilisation -- for it is government's fiscal, monetary and expenditure policy which establishes the context of economic activity, to the degree that that is possible in a world of economic interdependency. These two purposes -- effective expenditure on programs, and economic stabilisation -- on occasion conflict.

What is really important in this context is to remember that science and technology expenditure is "investment" expenditure, that for its success it cannot be disrupted by short-terms chops and changes -- and that government policy must be sensitive to this scientific fact of life if we are to achieve our objectives.

Let me conclude on an optimistic note. The problems, the challenges which face us are daunting. They require a collaboration between scientists, civil servants and politicians which -- at least in the past in my country -- seems to me to have been not the norm but the exception. But the challenge is not overwhelming -- and I believe that we will successfully meet it. So it is not with pessimism but with a sense of exhilaration that we should face our task, confident that together we shall be successful.





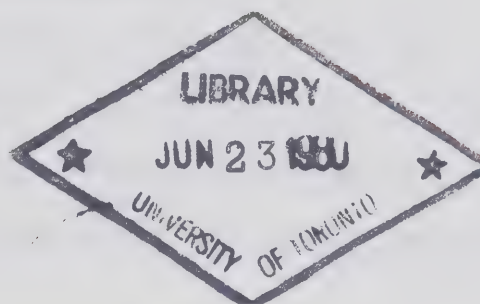
NOTES FOR A SPEECH

BY

THE HONOURABLE JOHN ROBERTS

TO THE

AUCC



QUEBEC CITY

JUNE 16, 1980



Minister of State

Science and Technology  
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I AM VERY PLEASED TO HAVE BEEN INVITED TO ADDRESS SUCH A DISTINGUISHED GROUP OF DEANS AND PRESIDENTS FROM THE ACADEMIC COMMUNITY.

IN MANY WAYS IT IS QUITE FITTING THAT LAVAL UNIVERSITY WAS SELECTED AS THE SITE FOR YOUR DELIBERATIONS ON UNIVERSITY RESEARCH IN CANADA. LAVAL HAS BEEN CHARACTERIZED BY SCIENCE FROM THE VERY BEGINNING OF ITS EXISTENCE WITH ITS CHARTER IN 1863. ITS FOUNDER, BISHOP LAVAL, WHO IS GOING TO BE BEATTIFIED IN ROME ON JUNE 22ND, NOT ONLY ESTABLISHED THE SEMINAIRE DU QUEBEC, WHICH BECAME LAVAL UNIVERSITY, BUT ALSO FOUNDED SIMULTANEOUSLY THE ÉCOLE DES MÉTIERS. THIS WAS CANADA'S FIRST SCHOOL OF TECHNOLOGY, AS EARLY AS 1650.

LAVAL'S FIRST RECTOR WAS A PROFESSOR OF PHYSICS AND ITS SECRETARY-GENERAL WAS A GEOLOGIST. THEY IMMEDIATELY GOT TOGETHER A REMARKABLE COLLECTION OF SCIENTIFIC INSTRUMENTS FROM EUROPE. THIS COLLECTION TODAY IS ONE OF THE MORE REMARKABLE AND UNIQUE MUSEUMS OF SCIENTIFIC INSTRUMENTS IN CANADA.

LAVAL WAS ONE OF THE FIRST FRANCOPHONE UNIVERSITIES TO BECOME INTERESTED IN SCIENTIFIC RESEARCH AND WE CAN NOTE SOME OF THE WORK OF ITS PIONEERS SUCH AS FRANCO RASETTI, CYRIAS OUELLET, PAUL-ANTOINE GIGUERE AND JOSEPH RISI. TODAY IT HAS LABORATORIES WITH AN INTERNATIONAL REPUTATION SUCH AS OPTICS, AGRICULTURE, CIVIL ENGINEERING AND ATOMIC PHYSICS, AND OF COURSE, MANY OF ITS PROFESSORS SERVE ON INTERNATIONAL COMMITTEES AND BOARDS.

AS THE MINISTER FOR SCIENCE AND TECHNOLOGY, I AM DEEPLY CONCERNED ABOUT THE CURRENT STATE OF OUR UNIVERSITIES, IN PARTICULAR ABOUT THE PART THEY PLAY IN CANADA'S NATIONAL RESEARCH AND DEVELOPMENT EFFORT. BEFORE I EXAMINE WITH YOU SOME OF THE IMPLICATIONS OF HIGHER SPENDING ON RESEARCH IN THE UNIVERSITIES, I WOULD LIKE TO COMMENT ON THE

PARTI QUEBECOIS WHITE PAPER ON SCIENCE WHICH WAS ISSUED RECENTLY.

MOST OF THE PARTI QUEBECOIS WHITE PAPER DESCRIBES THE IMPORTANT PLACE THAT SCIENCE HAS IN OUR LIVES; IT DEFINES THE ROLE OF UNIVERSITIES, INDUSTRY AND GOVERNMENT IN THE DEVELOPMENT AND USE OF SCIENCE TO REACH SHARED ECONOMIC AND SOCIAL GOALS; AND FINALLY, IT SETS OUT THE POLICIES AND PROGRAMMES WHICH THE PARTI QUEBECOIS INTENDS TO FOLLOW IN ORDER TO REALIZE MORE FULLY THE POTENTIAL OFFERED TO SOCIETY BY SCIENCE.

MY MINISTRY HAS REVIEWED THE PQ WHITE PAPER WITH CARE AND HAS CONCLUDED THAT IN MOST RESPECTS THE VIEWS ON THE NATURE OF SCIENCE POLICY AND THE OBJECTIVES WHICH IT EXPRESSED DO NOT DIFFER FROM THOSE OF THE FEDERAL GOVERNMENT. AS A CONSEQUENCE MANY OF THE PROPOSED POLICY AND PROGRAMME MEASURES ARE SIMILAR TO PROGRAMMES ALREADY IN EXISTENCE AT THE FEDERAL LEVEL.

MY PURPOSE IS NOT TO SUGGEST THAT THE FEDERAL GOVERNMENT IS WISER OR BETTER THAN OTHERS OR THAT ALL IS WELL IN SCIENCE POLICY. ON THE CONTRARY, I BELIEVE THAT SCIENCE IN THIS COUNTRY FACES SERIOUS PROBLEMS THAT NEED TO BE ADDRESSED THROUGH A COLLABORATIVE EFFORT BY ALL INTERESTED PARTIES.

MY INTENTIONS ARE QUITE DIFFERENT. I WANT TO UNDERLINE THAT THERE ARE STRIKING SIMILARITIES BOTH IN THE SCIENCE POLICY OBJECTIVES OF THE PQ WHITE PAPER AND THOSE OF THE FEDERAL GOVERNMENT BOTH IN TERMS OF THE OBJECTIVES THEMSELVES AND OF THE WAY IN WHICH THEY ARE TO BE REACHED. THERE ARE, THEREFORE, GOOD REASONS TO REJECT THE CLAIM THAT FEDERAL POLICIES AND PROGRAMMES CANNOT RESPOND TO THE ASPIRATIONS AND NEEDS OF THE PEOPLE OF QUEBEC. INDEED, I WOULD SUGGEST THAT THERE DOES NOW EXIST A STRONG BASIS FOR CO-OPERATION AND COLLABORATION.



UNFORTUNATELY, THE LAST PART OF THE PQ WHITE PAPER DOES NOT SEEM SUFFICIENTLY SENSITIVE TO THE NEED FOR THIS COOPERATIVE APPROACH. IT SETS OUT THE STEPS WHICH THE PARTI QUEBECOIS GOVERNMENT OF QUEBEC WANTS TO TAKE IMMEDIATELY. THEY ARE THAT:

1. QUEBEC MUST RECEIVE ITS FAIR SHARE OF FEDERAL RESOURCES DEVOTED TO SCIENCE.
2. IT MUST DO SO NOT BY TAKING ADVANTAGE OF EXISTING FEDERAL PROGRAMMES, BUT THROUGH THE DIRECT TRANSFER OF FUNDS OR OF TAX POINTS.
3. IT MUST TAKE OVER ALL FEDERAL PROGRAMMES IN SUPPORT OF UNIVERSITY RESEARCH.
4. QUEBEC MUST ALSO EXERCISE EXCLUSIVE JURISDICTION IN AREAS OF RESEARCH RELATED TO SECTORS FALLING WITHIN PROVINCIAL RESPONSIBILITIES.
5. FEDERAL RESEARCH ESTABLISHMENTS WORKING IN SUCH SECTORS SHOULD BE TURNED OVER TO QUEBEC.
6. THE RULES GOVERNING QUEBEC'S REPRESENTATION AT INTERNATIONAL CONFERENCES MUST BE CHANGED.

I CANNOT THEREFORE ACCEPT QUEBEC'S REQUEST FOR EXCLUSIVITY OF RESPONSIBILITY. I BELIEVE, VERY STRONGLY, THAT THERE ARE NATURAL INTERESTS IN SCIENCE POLICY - AND THE FEDERAL PRESENCE DOES HAVE A ROLE AND A RESPONSIBILITY TO TRY AND TO ENSURE THAT NATIONAL OBJECTIVES ARE BOTH DETERMINED AND ACHIEVED. SUCH A NATIONAL POLICY IS ESSENTIAL IF WE ARE TO HAVE THE NECESSARY SCIENTIFIC BASE FOR A PRODUCTIVE NATIONAL ECONOMY. THE SERIES OF SCIENCE AND TECHNOLOGICAL EFFORTS ARE THE FOUNDATION FOR THE INCREASED PRODUCTIVITY WE BADLY NEED IF WE ARE TO BE COMPETITIVE IN THE ECONOMIC WORLD OF THE 1980'S.

FOR THESE REASONS I COULD NOT ACCEPT ALL THE PROPOSALS OF THE QUEBEC WHITE PAPER.

FOR EXAMPLE, THE PQ WHITE PAPER INSISTS THAT THE RESPECTIVE JURISDICTION OF THE TWO LEVELS OF GOVERNMENT SHOULD BE RESPECTED. YET IT CLAIMS EXCLUSIVE JURISDICTION OVER AGRICULTURE WHICH IS A SHARED RESPONSIBILITY, OVER FISHERIES WHICH IS A FEDERAL ONE AND OVER ENERGY WHICH IS NOT ASSIGNED UNDER THE BNA ACT. IF ACCEPTED, THE DEMANDS WOULD PREVENT THE FEDERAL GOVERNMENT FROM DISCHARGING ITS RESPONSIBILITIES IN THE FIELD OF SCIENCE.

TO CITE ANOTHER AREA, THE PQ WHITE PAPER ASSUMES THAT RESPONSIBILITY FOR RESEARCH AND DEVELOPMENT CAN BE DIVIDED IN ACCORDANCE WITH POLITICAL JURISDICTIONS. THE HISTORY OF SCIENCE SHOWS THAT IT CANNOT. THE PQ WHITE PAPER DEMANDS EXCLUSIVE PROVINCIAL JURISDICTION OVER RESEARCH IN ENERGY. DOES THIS MEAN THAT THE FEDERAL GOVERNMENT CANNOT SUPPORT RESEARCH IN NUCLEAR FUSION OR FISSION? DOES EXCLUSIVE JURISDICTION OVER AGRICULTURAL RESEARCH MEAN THAT THE FEDERAL GOVERNMENT CANNOT SUPPORT RESEARCH IN BIOLOGY OR IN PLANT PATHOLOGY?

THESE FEW EXAMPLES SHOW, I THINK, THAT EACH AND EVERY ONE OF US WOULD BENEFIT MORE FROM CO-OPERATION AND COLLABORATION THAN FROM ORGANIZING SCIENCE ON THE BASIS OF POLITICAL JURISDICTIONS. SURELY, IT IS TO EVERYONE'S BENEFIT FOR THE FEDERAL GOVERNMENT TO NOURISH SCIENCE ACROSS THE COUNTRY AND TO PROMOTE INTERACTION AMONG ITS VARIOUS ELEMENTS WHEREVER LOCATED.

IT HAS BEEN ARGUED THAT QUEBEC UNIVERSITIES HAVE NOT BENEFITED AS MUCH AS THEY SHOULD HAVE FROM FEDERAL PROGRAMMES. THIS IS NOT THE RIGHT TIME TO ENTER INTO A STATISTICAL DEBATE. ALL THAT I CAN SAY

IS THAT THE RECORD IS NOT AS BAD AS IT IS SOMETIMES MADE TO BE NOR AS GOOD AS I WOULD LIKE IT TO BE.

FOR EXAMPLE, WITH 28% OF THE CANADIAN POPULATION, QUEBEC UNIVERSITIES HAVE 22% OF TOTAL CANADIAN FULL-TIME FACULTY WITH 15% IN FRANCOPHONE UNIVERSITIES. THIS 22% OF FACULTY RECEIVED, IN 1977-78 AND 1978-79 25% OF ALL FEDERAL RESEARCH SUPPORT, AND THE 15% FACULTY IN FRANCOPHONE UNIVERSITIES RECEIVED 18% OF THAT SUPPORT. THE FEDERAL PERFORMANCE IS GOOD OR BAD ACCORDING TO THE YARDSTICK USED. THUS IF POPULATION IS USED AS A YARDSTICK, ONE PICTURE EMERGES. IF FULL-TIME FACULTY IS USED, A DIFFERENT ONE IS PAINTED. IT IS CLEAR THEREFORE , IN TRYING TO GET A BALANCED VIEW OF SITUATIONS OF THIS KIND, THAT ONE CANNOT LOOK AT THIS FROM ONE PERSPECTIVE ONLY. IT IS CLEAR TO ME THAT SCIENCE AND TECHNOLOGY ARE RECEIVING INCREASED ATTENTION FROM ALL PROVINCES. I WELCOME THIS AND I HOPE THAT IT WILL LEAD TO NEW AVENUES OF COOPERATION WHERE SCIENCE WILL ACT AS A UNIFYING NOT AS A DIVISIVE FORCE. IT IS IN THIS SPIRIT THAT I WOULD LIKE TO END MY COMMENTS ON THE WHITE PAPER.

THE GOVERNMENT HAS AFFIRMED THE IMPORTANCE OF R&D FOR OUR ECONOMY, AND HAS RECENTLY RECONFIRMED THE NATIONAL TARGET OF 1.5% OF GNP TO BE SPENT ON R&D BY THE MID-80'S. THIS IS AN AMBITIOUS TARGET, BUT ITS ACHIEVEMENT WILL OFFER SIGNIFICANT BENEFITS. TO REACH THE TARGET WILL MEAN AN INCREASED EFFORT BY ALL SECTORS PERFORMING R&D, BUT ESPECIALLY THE INDUSTRIAL SECTOR.

UNIVERSITIES HAVE AN EXTREMELY IMPORTANT PART TO PLAY IN BRINGING OUR RESEARCH UP TO THIS NEW LEVEL. WHAT ARE, IN FACT, THE IMPLICATIONS FOR THE UNIVERSITIES OF 1.5% TARGET?

I BELIEVE WE CAN IDENTIFY FOUR MAIN ONES.



- MANPOWER. MOSST HAS ESTIMATED THAT AN ADDITIONAL 15,000 RESEARCHERS WILL BE NEEDED BY 1985 TO MEET THE TARGET. THE UNIVERSITIES ARE THE PRINCIPAL SOURCE OF THIS MANPOWER.
- CONCENTRATION AND SPECIALIZATION OF RESEARCH RESOURCES.  
THE ATTAINMENT OF NATIONAL SCIENCE OBJECTIVES WILL REQUIRE US TO MARSHALL OUR BEST SCIENTIFIC TALENT IN ADDRESSING PARTICULAR RESEARCH PROBLEMS. UNIVERSITIES WILL HAVE TO BALANCE NATIONAL NEEDS AND THE INCREASED RESEARCH INTERESTS OF THE PROVINCES.
- UNIVERSITY RESEARCH AND THE PUBLIC GOOD.  
IT WILL COST LARGE AMOUNTS OF MONEY TO REACH THE TARGET AND UNIVERSITIES MUST DEMONSTRATE THAT THEIR RESEARCH CAN BRING SUBSTANTIAL RETURNS ON THIS INVESTMENT. WE WILL NEED IMPROVED LINKS WITH THE PRODUCTIVE PROCESS. FURTHER DEVELOPMENT OF STRATEGIC PROGRAMMES DIRECTED AT PROBLEMS OF NATIONAL INTEREST WILL BE ENCOURAGED.
- BASIC RESEARCH. UNIVERSITIES WILL CONTINUE TO PROVIDE THE FOUNDATION OF OUR BASIC RESEARCH EFFORT. SCIENTISTS AND SCHOLARS IN THE UNIVERSITIES WILL CONTRIBUTE INCREASINGLY TO THE WORLD'S STORE OF BASIC KNOWLEDGE BUT AT THE SAME TIME WILL ALSO BE CALLED UPON TO IDENTIFY NEW DIRECTIONS FOR CANADIAN SCIENCE AND TECHNOLOGY. BASIC RESEARCH WILL BE REINFORCED.

THESE ARE DIFFICULT CHALLENGES. I RECOGNIZE THAT THEY ALSO HAVE TO BE FACED AT A TIME OF SERIOUS FINANCIAL AND STAFFING PROBLEMS IN THE UNIVERSITIES WHICH, I CAN ASSURE YOU, THE FEDERAL GOVERNMENT WILL TAKE INTO ACCOUNT IN FORMULATING ITS POLICIES TO GUIDE US TO THE NEW TARGET.

THE FIRST CHALLENGE CONCERNS HIGHLY QUALIFIED MANPOWER WHICH I SEE AS PROBABLY THE MAIN BARRIER WE FACE IN REACHING THE 1.5% TARGET.

STUDIES BY MINISTRY SUGGEST THAT THIS TARGET IMPLIES A SHORTFALL OF RESEARCH-TRAINED PERSONNEL OF BETWEEN 3,000 AND 4,000, LARGELY IN THE APPLIED FIELDS OF STUDY THAT IS, THE APPLIED SCIENCES AND ENGINEERING AS WELL AS BUSINESS ADMINISTRATION AND MANAGEMENT.

THE MOSST STUDIES AND THE SCIENCE COUNCIL REPORT UNIVERSITY RESEARCH IN JEOPARDY HAVE REVEALED REAL PROBLEMS OF PROVIDING AN ADEQUATE SUPPLY OF HIGHLY QUALIFIED MANPOWER. THE 18-24 AGE GROUP WILL DECLINE BY ABOUT 20% BY THE END OF THE 1980'S, AND WILL NOT BEGIN TO INCREASE AGAIN UNTIL THE MID 1990'S. THE EFFECT OF THIS DEMOGRAPHIC SHIFT WILL BE TO ACCENTUATE THE POTENTIAL MANPOWER SHORTAGES UNLESS SPECIAL EFFORTS ARE MADE TO INCREASE ENROLMENTS AND ENCOURAGE POST-GRADUATE WORK. THE FEDERAL GOVERNMENT IS MAKING THESE SPECIAL EFFORTS THROUGH THE FIVE-YEAR PLANS OF THE GRANTING COUNCILS.

AS PART OF NSERC'S ACCELERATED PROGRAMME WHICH I ANNOUNCED LAST MONTH TO THE CANADIAN ASSOCIATION OF UNIVERSITY RESEARCH ADMINISTRATORS, IT WILL BE PROVIDING MORE SCHOLARSHIPS AND FELLOWSHIPS FOR GRADUATE RESEARCH AND STUDY. FOR THE FIRST TIME IT IS INTRODUCING A PROGRAMME OF SUMMER STUDENTSHIPS TO GIVE UNDERGRADUATES MORE EXPOSURE TO RESEARCH.

I AM PLEASED TO INDICATE NOW THAT THE NSERC COUNCIL IS ANNOUNCING TODAY THE LAUNCHING OF A NEW PROGRAM OF UNIVERSITY RESEARCH FELLOWSHIPS TO EXPAND CAREER OPPORTUNITIES IN RESEARCH FOR A SELECT NUMBER OF VERY PROMISING RESEARCHERS IN THE NATURAL SCIENCES AND ENGINEERING. UP TO A HUNDRED (100) FIVE-YEAR AWARDS VALUED AT \$23,500 EACH PER ANNUM WILL BE OFFERED THIS SUMMER FOR A POTENTIAL EXPENDITURE OF APPROXIMATELY \$2.4MILLION IN 1980-81. THE COUNCIL PROPOSES TO AWARD AN ADDITIONAL 100 AWARDS EACH YEAR, RESULTING IN 500 IN FIVE YEARS TIME, THUS VALUING THE ENTIRE PROGRAM AT SOME \$12 MILLION DOLLARS.

THIS NEW PROGRAM WAS CONCEIVED BY NSERC IN EARLY 1979 AS A

FIRST STEP TOWARDS MEETING THE HIGHLY QUALIFIED MANPOWER CHALLENGE DESCRIBED IN THE COUNCIL'S FIVE-YEAR PLAN FOR THE SUPPORT OF UNIVERSITY RESEARCH. THE PLAN WAS APPROVED IN PRINCIPLE BY THE FEDERAL GOVERNMENT AND RELEASED LAST NOVEMBER. THIS NEW PROGRAM WILL ASSIST CANADA IN THE MAINTENANCE OF UNIVERSITY R&D AND IN THE PROVISION OF AN ADEQUATE SUPPLY OF PROMISING AND HIGHLY QUALIFIED RESEARCHERS IN CANADIAN UNIVERSITIES. THE AIM HERE IS TO HELP MEET THE EXPECTED INCREASED DEMAND FOR NEW FACULTY APPOINTMENTS IN THE EARLY 1990'S CAUSED BY AN INCREASED RETIREMENT RATE OF EXISTING FACULTY AND INCREASED STUDENT ENROLMENTS.

I FULLY RECOGNIZE THAT THE CHOICE OF A RESEARCH CAREER IS NOT GOING TO BE MADE JUST ON THE BASIS OF THE AVAILABILITY OF A SCHOLARSHIP. IT IS GOING TO DEPEND IN THE MAIN ON THE PERCEPTION THAT YOUNG PEOPLE HAVE OF THE FUTURE OF RESEARCH IN CANADA - THAT GOVERNMENTS AND INDUSTRY ARE PREPARED TO INVEST IN RESEARCH AND CREATE CHALLENGING RESEARCH JOBS. I BELIEVE ONE OF MY MAIN TASKS IS TO PROMOTE A RICH AND VARIED RESEARCH ENVIRONMENT IN CANADA WHICH WILL ENCOURAGE THESE YOUNG PEOPLE TOWARDS A RESEARCH CAREER.

THE SECOND CHALLENGE TURNS AROUND SPECIALIZATION AND CONCENTRATION OF RESEARCH. THE LAST ANNUAL REPORT OF THE SCIENCE COUNCIL STATES THAT "THE SEVENTIES SHOULD HAVE BEEN CHARACTERIZED BY A MOVE TOWARD SPECIALIZATION; A MOVE WHICH, AT THE SAME TIME, WOULD HAVE OVERCOME MUCH OF THE DILUTION OF EFFORT THAT DIFFERENTIATED THE CANADIAN PATTERN OF DEVELOPMENT FROM THAT IN THE UNITED STATES". UNFORTUNATELY THIS DID NOT HAPPEN. IN THE PAST, IT WAS POSSIBLE FOR MOST INSTITUTIONS TO MAINTAIN AND EVEN INITIATE GRADUATE PROGRAMMES ACROSS A WIDE SPECTRUM OF DISCIPLINES. THIS APPROACH IS ONE WE CAN NO LONGER AFFORD.



SPECILIZATION AND CONCENTRATION OF UNIVERSITY RESEARCH REQUIRE HARD CHOICES -- I RECOGNIZE THAT. WHAT IS THE BASIS FOR MAKING THOSE DECISIONS -- I THINK MANY OF YOU WILL KNOW THIS BETTER THAN I. TWO CRITERIA WHICH ARE PERHAPS OBVIOUS BUT DO NOT, I THINK, RECEIVE SUFFICIENT ATTENTION AT PRESENT ARE:

- (1) GREATER SUPPORT FOR THE TRULY EXCELLENT EVEN IF THIS MEANS A LOWER NUMBER OF AWARDS; AND
- (2) THE SIGNIFICANCE OF PARTICULAR RESEARCH TO REGIONAL OR PROVINCIAL INTERESTS -- THIS LATTER CRITERION IS RELEVANT MORE TO APPLIED FIELDS OF RESEARCH BUT WILL AFFECT BASIC RESEARCH AS WELL.

FOR EXAMPLE, WE CONCENTRATE ON OCEANS RESEARCH FROM BASIC MARINE BIOLOGY TO OCEAN ENGINEERING IN CERTAIN ATLANTIC AND PACIFIC COAST CENTRES WHERE IT MAKES SENSE TO LOCATE THAT RESEARCH BECAUSE OF THE PERVASIVE CONCERN WITH THE OCEANS IN THOSE REGIONS.

I BELIEVE THAT THIS KIND OF RATIONALIZATION CAN BEST BE INITIATED BY THE UNIVERSITIES THEMSELVES, BUT THE DECISIONS ON CONCENTRATION WILL CERTAINLY BE INFLUENCED BY THE STRATEGIC AND EQUIPMENT PROGRAMS OF NSERC AND THE OTHER COUNCILS AS WELL AS BY PROVINCIAL SCIENCE OBJECTIVES AND POLICIES. IT IS IN THE INTEREST OF ALL THREE PARTIES, AND THE COUNTRY AS A WHOLE, THAT HARD DECISIONS BE MADE WHICH WILL ELIMINATE UNNECESSARY DUPLICATION AND STRENGTHEN OUR RESEARCH AND MANPOWER TRAINING CAPABILITIES IN AREAS OF LONG TERM IMPORTANCE TO THE COUNTRY'S SOCIAL, ECONOMIC AND SCIENTIFIC DEVELOPMENT.

AS FOR UNIVERSITY RESEARCH AND THE PUBLIC INTEREST BY WHICH I MEAN RESEARCH IN AREAS OF NATIONAL INTEREST AND UNIVERSITY-INDUSTRY LINKAGES, UNIVERSITIES REPRESENT AN UNEQUALED SOURCE OF RESEARCH TALENT ACROSS A WIDE RANGE OF DISCIPLINE WHICH MORE AND MORE WILL BE CALLED

UPON TO OFFER ADVICE AND ASSISTANCE TO INDUSTRY, GOVERNMENTS AND SOCIETY IN GENERAL.

THE FIVE-YEAR PLANS OF THE COUNCILS PROPOSE, IN A THOUGHTFUL AND IMAGINATIVE WAY, NEW AND EXPANDED PROGRAMMES OF SUPPORT WHICH WILL ENCOURAGE THIS FLOW OF IDEAS AND EXPERTISE TO TAKE PLACE. I AM WATCHING THE PROCESS OF THESE NEW PROGRAMMES WITH GREAT INTEREST.

CLEARLY, THERE WAS SOME INITIAL HESITATION ON THE PART OF THE ACADEMIC COMMUNITY TO ACCEPT AND GET INVOLVED IN THE STRATEGIC AND THEMATIC PROGRAMMES BECAUSE THEY SEEM TO IMPLY SOME DIRECTION FROM OUTSIDE. THERE HAS BEEN, I AM TOLD, A SIGNIFICANT CHANGE IN THIS ATTITUDE AND CERTAINLY IN THE CASE OF NSERC WE NOW FIND THE BEST OF OUR RESEARCHERS MAKING APPLICATIONS AND BEING SUCCESSFUL. THIS IS MOST ENCOURAGING. THERE IS NO SENSE OF COERCION IN THESE PROGRAMMES - THE SCIENTISTS AND ENGINEERS THEMSELVES DECIDE ON THE SPECIFIC RESEARCH OR SCHOLARLY OBJECTIVES.

THE FIVE-YEAR PLANS ALSO STRESS THE NEED TO KEEP A FLOURISHING LEVEL OF FREE RESEARCH. THIS IS THE FOURTH CHALLENGE. ONE OF THE MAIN REASONS WHICH LED THE FEDERAL GOVERNMENT TO SUPPORT UNIVERSITY RESEARCH WAS TO ESTABLISH AND MAINTAIN A BASIC RESEARCH CAPACITY IN CANADA. IT WAS BELIEVED THAT BASIC RESEARCH COULD BEST FLOURISH IN A FREE, OPEN AND MULTIDISCIPLINARY ENVIRONMENT WHICH CHARACTERIZED THE UNIVERSITIES. ANOTHER PATH WOULD HAVE BEEN THE CREATION OF A NUMBER OF SPECIALIZED NATIONAL RESEARCH INSTITUTES.

BASIC RESEARCH, INDEED ALL RESEARCH, TO FLOURISH, NEEDS TO BE ASSURED OF STABLE FUNDING. THE GOVERNMENT HAS UNDER CONSIDERATION THE PLANS OF THE COUNCILS FOR THE YEARS 1981-84. I HOPE THAT IT WILL ARRIVE AT A DECISION SHORTLY.

I HOPE YOU HAVE FOUND THESE WORDS OF MINE ENCOURAGING. I, ON THE POLITICAL SIDE, AM WORKING HARD TO RAISE OUR LEVEL OF SPENDING ON R&D TO OUR TARGET OF 1.5%. I MIGHT SAY THAT FEDERAL EXPENDITURES ON R&D FOR THIS YEAR ARE ON TRACK TOWARDS THE 1.5% TARGET. I LOOK TO THE AUCC TO ENCOURAGE OUR UNIVERSITIES TO INCREASE THEIR RESEARCH EFFORTS IN AREAS OF NATIONAL INTEREST.





NOTES FOR A SPEECH

BY

THE HONOURABLE JOHN ROBERTS

TO THE

FIRST CANADIAN CONFERENCE ON ASTRONAUTICS

NEW DIRECTIONS  
FOR THE  
CANADIAN SPACE PROGRAM

OCTOBER 21, 1980



Minister of State

Science and Technology  
Canada

Ministre d'État

Sciences et Technologie  
Canada

**Check  
against  
delivery**





IT IS AN HONOUR AND PLEASURE FOR ME TO HAVE THE OPPORTUNITY TO ADDRESS THE "FIRST CANADIAN CONFERENCE ON ASTRONAUTICS". MY ONLY REGRET IS THAT CIRCUMSTANCES DO NOT PERMIT ME TO BE PRESENT. INSTEAD, THROUGH THE WONDERS OF HIGH TECHNOLOGY, I CAN STILL PARTICIPATE EVEN THOUGH I AM IN VANCOUVER. AS THE MINISTER OF SCIENCE AND TECHNOLOGY SPEAKING TO MEMBERS OF THE CANADIAN SPACE COMMUNITY, I AM DOUBLY AWARE OF THE SIGNIFICANCE IN USING THIS PARTICULAR ASPECT OF CANADIAN HIGH TECHNOLOGY.

USING THIS PARTICULAR TECHNOLOGY TODAY BRINGS TO MIND THE MEMORABLE OCCASION IN THE BRITISH HOUSE OF COMMONS WHEN DEBATE WAS INTERRUPTED AND IT WAS ANNOUNCED THAT THE FIRST CABLE LINK TO AFRICA HAD BEEN COMPLETED.

AFTER THE HUZZAHS AND THE SELF-CONGRATULATION HAD DIED DOWN, WINSTON CHURCHILL -- THEN IN ONE OF HIS MANY BOUTS OF DISFAVOUR WITH ALL PARTIES -- CAUGHT THE EYE

OF THE SPEAKER. ON BEING RECOGNIZED, CHURCHILL SAID:

'EXCELLENT, EXCELLENT. NOW, WHAT SHALL WE  
TELL THE AFRICANS?'

I WOULD HOPE THAT I DO NOT MEET A SIMILAR  
QUERY FOR USING TODAY'S EQUIVALENT TO THE CABLE IN  
SPEAKING TO YOU. I'M SURE IT WON'T BE THE CASE BECAUSE  
I BELIEVE THERE IS MAJOR IMPORT FOR CANADIAN SPACE  
ACTIVITIES IN WHAT I AM ABOUT TO OUTLINE.

THE FEDERAL GOVERNMENT IS RE-STRUCTURING ITS  
ORGANIZATION FOR SPACE ACTIVITIES IN ORDER TO MOVE  
FORWARD IN A BROAD RANGE OF SPACE APPLICATIONS. IT WILL  
ALSO BE LOOKING AT A REVISED FIVE-YEAR PLAN.

THESE TWO MAJOR EVENTS -- PROGRAM DECISIONS  
AND GOVERNMENT RE-STRUCTURING FOR SPACE -- ARE HAPPENING

THIS FALL AND WILL BE DOMINANT FACTORS IN DETERMINING THE CANADIAN SPACE PROGRAM IN THE 1980s.

WHAT ARE SOME OF THE REASONS FOR THE PRIME MINISTER DECIDING TO RE-STRUCTURE THE GOVERNMENT'S SPACE ORGANIZATION?

THE SPACE PROGRAM IS CERTAINLY AMONG THE MORE SUCCESSFUL SCIENCE AND INDUSTRIAL DEVELOPMENT PROGRAMS UNDERTAKEN BY THE GOVERNMENT. BEGINNING ONLY IN THE 1960s, ITS OUTPUT NOW AMOUNTS TO \$140 MILLION, ITS EXPORTS TOTAL \$60 MILLION AND IT EMPLOYS 2,500 PERSONS.

THIS SUCCESS ITSELF BRED THE NEED FOR RE-ORGANIZATION OF SPACE ACTIVITIES WITHIN GOVERNMENT. BECAUSE OF THE IMPORTANCE OF THE COUNTRY'S SPACE EFFORTS IN TERMS OF DEVELOPING AN INDUSTRIAL CAPABILITY AT THE LEADING EDGES OF HIGH TECHNOLOGY, THE GOVERNMENT REQUESTED A RE-EXAMINATION OF THE EFFECTIVENESS OF



MEASURES TO IMPROVE THE CANADIAN SPACE PROGRAM.

THIS LED TO A REVIEW BY THE MINISTRY OF STATE FOR SCIENCE AND TECHNOLOGY OF THE MECHANISMS FOR CO-ORDINATING CANADA'S ACTIVITIES IN SPACE. THE MOSST REPORT WAS COMPLETED IN JULY 1979. CONCURRENTLY, INDUSTRY WAS ALSO MAKING ITS VIEWS KNOWN ON THE DESIRABILITIES OF A MORE FOCUSED GOVERNMENT APPROACH TO THE SPACE PROGRAM.

AS A RESULT, THE PRIME MINISTER HAS TAKEN SOME INITIAL, VERY IMPORTANT STEPS TO RESTRUCTURE THE GOVERNMENT'S ORGANIZATION FOR SPACE. OTHER SIGNIFICANT STEPS WILL FOLLOW SOON.

WHAT HAS HAPPENED SO FAR? ON JULY 31, THE PRIME MINISTER ASSIGNED TO ME AND MY MINISTRY TWO VERY IMPORTANT FUNCTIONS AS THE INITIAL STEPS IN THE CREATION OF A STRONG, CENTRAL FOCUS WITHIN THE GOVERNMENT FOR SPACE AND DEVELOPMENT.

FIRSTLY, I HAVE BEEN GIVEN THE RESPONSIBILITY FOR SPACE R&D POLICY, THE FIRST TIME THAT A SINGLE MINISTER HAS BEEN GIVEN THIS ROLE. THIS IS PROBABLY THE MOST SIGNIFICANT STEP BECAUSE IT WILL ENABLE US TO GIVE THE FOCUSED ATTENTION REQUIRED BY THE SECTOR.

SECONDLY, AS AN AID IN IMPLEMENTING OUR POLICY MANDATE, I AM NOW RESPONSIBLE FOR CO-ORDINATING ALL THE GOVERNMENT'S SPACE ACTIVITIES. TO ACCOMPLISH THIS, THE CHAIRMANSHIP AND SECRETARIAT OF THE INTERDEPARTMENTAL COMMITTEE ON SPACE (ICS) ARE NOW MY RESPONSIBILITY.

WITH THESE FIRST STEPS IT NOW BECOMES POSSIBLE:

-- TO DEVELOP POLICIES AND LONG-TERM STRATEGIES,  
PLAN PROGRAM DEVELOPMENTS, AND ESTABLISH RELATIVE  
PRIORITIES, AMONGST PROJECTS COMPETING FOR SCARCE  
RESOURCES;

-- TO DEVELOP A NATIONAL SPACE DEVELOPMENT PROGRAM  
RESPONSIVE TO NATIONAL NEEDS AS WELL AS  
DEPARTMENTAL NEEDS; AND

-- TO PROVIDE A GREATER DEGREE OF POLICY STABILITY  
IN PURSUIT OF LONG-TERM OBJECTIVES.

THE PRIME MINISTER HAS INDICATED THAT THESE ARE THE  
INITIAL STEPS IN PROVIDING A STRONG FOCUS FOR THE SPACE  
PROGRAM. LET ME UNDERLINE THAT MY OFFICIALS  
AND I ARE FULLY AWARE THAT THEY CORRECT ONLY SOME OF THE  
DEFICIENCIES NOTED IN THE INDUSTRY'S REPRESENTATIONS TO THE  
GOVERNMENT.



THE NEXT STEPS WILL ADDRESS, AMONG OTHERS,  
THE REMAINING SHORTCOMINGS NOTED IN BOTH THE MOSST REPORT  
AND THE INDUSTRY'S SUBMISSIONS TO THE GOVERNMENT. IN  
MY VIEW, THE NEW ORGANIZATION IN SPACE WILL EMPHASIZE  
FOUR KEY FEATURES:

1. IT WILL HAVE CLEAR RESPONSIBILITY AND  
AUTHORITY FOR THE DEFINITION, DEVELOPMENT,  
AND DIRECTION OF A NATIONAL SPACE DEVELOPMENT  
PROGRAM. IT WILL HAVE CHARGE OF A SPACE  
BUDGET WITH AUTHORITY TO RECOMMEND PROGRAM  
PRIORITIES, SCHEDULING AND EXPENDITURES.  
THAT IS A POSITIVE STEP AND ONE FOR WHICH  
YOU HAVE ASKED.
2. THE NEW ORGANIZATION WILL BE RESPONSIBLE FOR  
ENSURING THE CONTINUED DEVELOPMENT OF A  
HEALTHY, CANADIAN SPACE MANUFACTURING AND  
SERVICE INDUSTRY. AGAIN, THIS IS IN

RESPONSE TO YOUR CONCERNS ABOUT FRAGMENTATION OF RESPONSIBILITIES AND THE DELETERIOUS EFFECTS ON THE INDUSTRY. THERE WILL BE CONSULTATION WITH INDUSTRY AND THE JOINT DEVELOPMENT OF INDUSTRIAL STRATEGY IN SPACE R&D PROGRAMS.

3. IT WILL PROVIDE A FOCUS FOR CANADIAN INTERNATIONAL OPERATION AND NEGOTIATION IN SPACE MATTERS. INTERNATIONAL DEALINGS ON OPERATIONAL PROGRAMS WILL REMAIN THE RESPONSIBILITY OF THE USERS BUT WILL BE COORDINATED BY THE NEW STRUCTURE.

4. IT WILL MARKET BENEFITS TO POTENTIAL USERS -- BOTH GOVERNMENT AND NON-GOVERNMENT. THE SUCCESS OF THE PRESENT SPACE PROGRAM INDICATES THIS IS AN IMPORTANT CONSIDERATION AND ONE IN WHICH PRESENT EXPERTISE CAN READILY BE PUT TO USE.

I DO BELIEVE THAT YOUR MAJOR CONCERNS THAT THERE BE CLEAR RESPONSIBILITY AND AUTHORITY FOR THE DEFINITION, DEVELOPMENT AND DIRECTION OF A NATIONAL SPACE PROGRAM WILL BE MET. I FOR MY PART, FEEL CONFIDENT THAT WE ARE NOW ON THE RIGHT TRACK AND WE HAVE THE PEOPLE WHO WILL MAKE THE PROGRAM A SUCCESS. INDEED, THESE ARE THE PEOPLE WHO ARE BRINGING YOU THIS SATELLITE TRANSMISSION AT THIS VERY MINUTE.

THE RESTRUCTURING THAT IS IN PROCESS IS NOT AN END IN ITSELF. ITS IMPORTANCE LIES IN THE ENHANCED POLICY, PROGRAM PLANNING, AND IMPLEMENTATION CAPABILITIES THAT WILL RESULT. THE NEW STRUCTURE WILL ALLOW US TO CAPITALIZE MORE EFFICIENTLY AND MORE EFFECTIVELY ON THE CHALLENGES AND OPPORTUNITIES THAT THE FUTURE HOLDS FOR US.



FOR THIS REASON, THESE RESTRUCTURING ACTIVITIES WILL HAVE A MARKED INFLUENCE ON THE CANADIAN SPACE PROGRAM AS WE MOVE BOLDLY INTO THE EIGHTIES. THE RANGE AND SCOPE OF POSSIBILITIES FOR SPACE TECHNOLOGY APPLICATIONS, AS WE ENTER THE 1980s, ARE IMMENSE.

EVEN THOUGH THE COMMUNICATIONS AREA IS FAIRLY MATURE, NEW SERVICES UNDER CONSIDERATION INCLUDE DIRECT BROADCAST BY SATELLITE OF TELEVISION AND RADIO PROGRAMS AND A COMMUNICATION SATELLITE SYSTEM FOR USE BY MOBILE USERS, PARTICULARLY IN REMOTE AREAS. TELESAT, WHICH ALREADY OPERATES A FIRST CLASS DOMESTIC SATELLITE COMMUNICATIONS SYSTEM, WILL SOON HAVE A SECOND SYSTEM IN SERVICE.

ANOTHER AREA FOR DEVELOPMENT IS THE RELATIVELY NEW ONE OF SATELLITE REMOTE SENSING, WITH NEW SYSTEMS PLANNED FOR LAUNCHING BY SEVERAL COUNTRIES.

OF PARTICULAR INTEREST TO CANADA ARE THE NEW SENSORS BEING DEVELOPED AND THE SYNTHETIC APERTURE RADAR SYSTEM THAT CAN PROVIDE ALL-WEATHER SURVEILLANCE, NIGHT OR DAY.

ANOTHER AREA OF INTEREST FOR CANADA, GIVEN OUR VAST UNDERPOPULATED EXPANSES, ARE SEARCH AND RESCUE SATELLITE SYSTEMS WHICH ARE NOW UNDER DEVELOPMENT AND WHICH WILL BE DEMONSTRATED IN THE EARLY PART OF THIS DECADE. THEY COULD LEAD TO AN OPERATIONAL SYSTEM BY THE END OF THE EIGHTIES.

ALL OF THESE ARE IMPORTANT AREAS OF APPLICATION TO CANADA. THE RE-ORGANIZATION I HAVE OUTLINED AND A REVISED FIVE-YEAR PLAN, WHICH WE WILL BE LOOKING AT, WILL ALLOW THE INDUSTRY AND GOVERNMENT TO MOVE FORWARD ON A BROAD RANGE OF SPACE APPLICATIONS.

THE REVISED FIVE-YEAR SPACE PLAN, ALONG WITH THE RE-STRUCTURING, WILL BE DOMINANT FACTORS IN DETERMINING THE CANADIAN SPACE PROGRAM IN THE EIGHTIES.

LAST YEAR, FOR THE FIRST TIME, A FIVE-YEAR SPACE PROGRAM PLAN WAS PRODUCED AND PUBLISHED. THIS WAS A FIRST ATTEMPT AT LONG-TERM PLANNING FOR SPACE. IT WAS ESSENTIALLY THE AGGREGATION OF INDIVIDUAL DEPARTMENTAL PROJECT PLANS, PUT TOGETHER IN A WAY THAT GAVE AN OVERVIEW OF THE CANADIAN SPACE PROGRAM. THE PLAN STRESSED THE INTER-RELATIONSHIP BETWEEN PROJECTS.

INDUSTRY WAS ASKED TO COMMENT ON THE PLAN AND WE RECEIVED MANY EXCELLENT REPLIES FROM INDIVIDUAL AGENCIES AND THE AIR INDUSTRIES ASSOCIATION OF CANADA. THESE REPLIES HEARTILY ENDORSED THE CONCEPT OF A FIVE-YEAR PLAN, AND ALSO MADE SOME VALUABLE SUGGESTIONS ON THE CONTENT OF THE PLAN AND THE CONSULTATIVE PROCESS WITH INDUSTRY. NOW THAT WE ARE



NEARING THE END OF THIS YEAR'S UPDATE IT MIGHT BE INSTRUCTIVE TO ASSESS THE IMPACT OF THESE SUGGESTIONS.

TWO MAJOR POINTS RAISED BY INDUSTRY LAST YEAR WERE: THE LACK OF SPECIFIC LONG-TERM GOALS AND A GENERAL STRATEGY FOR ACHIEVING THEM; THE LACK OF EMPHASIS ON PROGRAMS CONTAINING SYSTEM LEVEL INITIATIVES.

THIS YEAR, THE PLAN WILL PROPOSE TO THE GOVERNMENT SPECIFIC LONG-TERM OBJECTIVES AND STRATEGIES. THE DRIVING ASSUMPTIONS IN THIS YEAR'S PLAN ARE THAT CANADA WILL HAVE AN INCREASING NEED FOR NEW SATELLITE SERVICES IN COMMUNICATIONS AND REMOTE SENSING APPLICATION AREAS.

THE OBJECTIVES ARE LONG-TERM SINCE THEY INVOLVE CONSIDERATION OF OPERATIONAL SYSTEMS IN THE 1990s. THE STRATEGIES PROPOSED FOR ACHIEVING THESE OBJECTIVES BUILD ON OUR EXISTING STRENGTHS AND INVOLVE PREPARATORY WORK SO THAT SYSTEM LEVEL INITIATIVES IN BOTH THE COMMUNICATIONS AND REMOTE SENSING AREAS CAN BE TAKEN IN THE NEAR FUTURE.

INDUSTRY ALSO MADE THE SUGGESTION THAT TECHNOLOGY DEVELOPMENT SHOULD BE RECOGNIZED AS AN IMPORTANT PART OF OUR SPACE PLAN. THIS YEAR'S PLAN INCLUDES A TECHNOLOGY DEVELOPMENT PROGRAM WITH THE OBJECTIVE OF DEVELOPING SPECIFIC SKILLS AND TECHNIQUES WITHIN INDUSTRY TO PREPARE IT TO MEET CURRENT AND FORESEEN NATIONAL REQUIREMENTS -- AS WELL AS TO MEET FOREIGN COMPETITION IN BOTH DOMESTIC AND FOREIGN MARKETS.

THE TECHNOLOGY DEVELOPMENT PROGRAM REPRESENTS OUR LONG-TERM INVESTMENT IN R&D ESSENTIAL TO THE SUCCESS OF THE SPACE PROGRAM.

BY INTEGRATING THE VIEWS OF INDUSTRY WITH THE NATIONAL NEEDS FOR SPACE SERVICES WE HAVE MADE A SIGNIFICANT STEP IN ENHANCING THE VALUE OF THE PLAN. IF FOLLOWED, THE PLAN WOULD MAKE A CONSIDERABLE CONTRIBUTION TO THE SOCIAL AND ECONOMIC GROWTH OF THE COUNTRY. HOWEVER, IN VIEW OF COMPETING DEMANDS ON THE LIMITED RESOURCES OF

GOVERNMENT, IT MAY NOT BE POSSIBLE TO SUPPORT ALL THE INITIATIVES.

IF THIS IS THE CASE, SOME VERY IMPORTANT DECISIONS WILL HAVE TO BE MADE KEEPING IN MIND BASIC OBJECTIVES OF THE PROGRAM.

WE MAY HAVE TO CONSIDER THE RELATIVE PRIORITIES OF THE PROGRAM, ALTER THE TIME SCALE FOR THE INTRODUCTION OF NEW SERVICES, OR CONSIDER DIFFERENT LEVELS OF SERVICE. IF WE HAVE TO MAKE SUCH DECISIONS, WE WILL HAVE TO CONSULT FURTHER WITH INDUSTRY.

AS I HAVE POINTED OUT, WE HAVE MADE SOME IMPORTANT IMPROVEMENTS IN THE CONSULTATIVE PROCESS BETWEEN GOVERNMENT AND INDUSTRY WHICH ARE HAVING MAJOR BENEFICIAL EFFECTS ON OUR PLANNING PROCESS. THE PROJECT PROPOSALS WERE SUBMITTED TO INDUSTRY FOR COMMENT BEFORE THE GOVERNMENT DECISION PROCESS STARTED.



WHILE THE TIME FOR REACTION WAS VERY SHORT, THERE WAS A REAL OPPORTUNITY FOR INDUSTRY TO INFLUENCE THE FINAL RESULT.

IN ADDITION, BILATERAL DISCUSSIONS HAVE TAKEN PLACE REGARDING THE IMPLICATIONS OF POSSIBLE ALTERNATIVE PLANS SHOULD SUFFICIENT RESOURCES NOT BE AVAILABLE FOR THE FULL PLAN. THIS MARKS THE FIRST TIME THAT INDUSTRY HAS PARTICIPATED IN WHAT AMOUNTS TO A PRIORITY-SETTING EXERCISE.

DESPITE THESE ADVANCES, I FEEL WE CAN AND MUST DO BETTER IN THE FUTURE.

WHILE THE SPACE PROGRAM COMMENCED WITH THE NEED TO SATISFY THE MISSION REQUIREMENTS FOR GOVERNMENT DEPARTMENTS, THE IMPLEMENTATIONS POLICY ENSURED THE DEVELOPMENT OF A DOMESTIC SPACE MANUFACTURING INDUSTRY. THE NATURE AND EXTENT OF THIS INDUSTRIAL DEVELOPMENT NOW DEMANDS THAT INDUSTRY CONSIDERATIONS BE PART OF THE PROGRAM PLANNING PROCESS. WE NO LONGER HAVE JUST A SPACE PROGRAM. WE HAVE A PARTNERSHIP BETWEEN GOVERNMENT AND INDUSTRY.

THIS IS NOT A ONE SIDED AFFAIR. IT IS NOT JUST A MATTER OF THE GOVERNMENT TELLING INDUSTRY ABOUT ITS PROPOSALS AND PLANS. INDUSTRY MUST RECIPROCATE. I WOULD EXPECT INDUSTRY, FOR ITS PART, TO SUBMIT ITS PLANS AND INTENTIONS TO SCRUTINY.

THIS IMPLIES A JOINT COMMITMENT TO COMMON OBJECTIVES. SUCH A SPECIAL RELATIONSHIP REQUIRES SPECIAL CONSULTATIVE MECHANISMS. IN MY VIEW, THIS NEED IS ONE OF THE UNDERLYING REASONS CONTRIBUTING TO THE PRIME MINISTER'S DECISION TO RESTRUCTURE THE GOVERNMENT'S ORGANIZATION FOR SPACE.

IN SUMMARY, WE HAVE MADE SIGNIFICANT PROGRESS BOTH IN TERMS OF SPECIFIC PROGRAM PLANS AND THE PROCESS FOR CONSULTATIONS BETWEEN GOVERNMENT AND INDUSTRY. THE UP-DATED PLAN IS A GREAT IMPROVEMENT OVER THE INITIAL PLAN BECAUSE IT TAKES INDUSTRY'S VIEWS INTO ACCOUNT.

IF, IN THE FACE OF FISCAL RESTRAINT, WE HAVE TO ALTER THE PLAN FURTHER CONSULTATION WITH INDUSTRY DEFINITELY WOULD HAVE TO BE PART OF THE DECISION MAKING PROCESS.

IN CONCLUDING, I WOULD LIKE TO SUMMARIZE MY FEELINGS ABOUT THE FUTURE OF CANADIAN SPACE PROGRAMS. BUT IN TALKING TO SPECIALISTS IN THE SPACE FIELD, I CANNOT BUT HELP THINKING ABOUT THE MAN WHO WAS KILLED IN THE FLOODS IN FLORENCE, ITALY A FEW YEARS BACK.

HE MADE HIS WAY TO HEAVEN AND, AT THE PEARLY GATES, HE WAS ASKED TO GIVE HIS CASE HISTORY -- TO TELL THE STORY OF HOW HE DIED AND CAME TO HEAVEN. THIS HE OBLIGINGLY DID. ST. PETER THOUGHT THE STORY SO INTERESTING THAT HE ASKED THE FLORINTINE IF HE WOULD AGREE TO TALK TO THE OTHER ANGELS IN HEAVEN, TELLING THEM ALL ABOUT THE FLOOD AND HIS DEMISE.



THE NEW ARRIVAL WAS VERY MUCH FLATTERED AND HE IMMEDIATELY ACCEPTED THE INVITATION. AS HE FLEW AWAY, A KIND OLDER ANGEL TUGGED AT THE SLEEVE OF HIS ROBE AND SAID, "SIR, I THINK I OUGHT TO TELL YOU THAT NOAH WILL BE IN THE AUDIENCE."

MY POINT IS THAT I'M SOMEWHAT ABASHED TO TALK ON SPACE MATTERS WHEN ALL OF YOU ARE EXPERTS IN THE FIELD. THAT NOTWITHSTANDING, I WOULD LIKE TO CONCLUDE BY SUMMARIZING MY FEELINGS ABOUT THE FUTURE OF THE CANADIAN SPACE PROGRAM.

DURING THE SEVENTIES WE CONCENTRATED ON BUILDING TECHNOLOGY AND APPLICATIONS EXPERTISE IN THE COMMUNICATIONS AND REMOTE SENSING AREAS. THIS WAS A MASTERSTROKE OF FORWARD THINKING.

AS WE HEAD INTO THE EIGHTIES IT IS CLEAR THAT NATIONAL AND WORLD-WIDE DEVELOPMENTS IN SUCH DIVERSE

AREAS AS ENERGY DEVELOPMENT, OCEAN POLICIES, NORTHERN DEVELOPMENT, NATIONAL SECURITY AND CULTURAL SOVEREIGNTY HAVE RE-INFORCED COMMUNICATIONS AND REMOTE SENSING AS THE CORNER-STONES OF OUR USE OF SPACE. WE HAVE THE APPLICATIONS EXPERTISE AND THE INDUSTRIAL INFRASTRUCTURE IN PLACE.

BECAUSE OF OUR ACTIONS IN THE PAST, WE ARE NOW IN A GOOD POSITION TO CAPITALIZE ON THE NEW OPPORTUNITIES IN SATELLITE COMMUNICATIONS AFFORDED BY NEW FREQUENCY ALLOCATIONS, AND ON NEW REMOTE SENSING SERVICES POSSIBLE WITH NEW SENSORS LIKE THE SYNTHETIC APERTURE RADAR.

I THINK WE HAVE BUILT AN EXCELLENT FOUNDATION FROM WHICH TO LAUNCH INITIATIVES IN THE EIGHTIES THAT WILL BE AS IMPORTANT AS THOSE CONDUCTED IN THE SEVENTIES. WE ARE IN THE ENVIABLE POSITION OF HAVING MORE TO DO IN

SPACE THAN WE ARE CAPABLE OF DOING NOW AND THIS IS GOOD HARBINGER FOR CONTINUED GROWTH. THIS GROWTH WILL LIKELY COME, MORE AND MORE, FROM COMMERCIAL ACTIVITIES -- BOTH DOMESTIC AND INTERNATIONAL -- AS THE USE OF SPACE BECOMES MORE COMMON PLACE IN CANADA AND AROUND THE WORLD.

IN SHORT, THE FUTURE IS BRIGHT. THE GOVERNMENT IS COMMITTED TO MAINTAINING THE SUCCESS OF THE CANADIAN SPACE PROGRAM. I EXPECT CANADIAN INDUSTRY TO CONTINUE ITS EFFORTS TO ACHIEVE HIGHER LEVELS OF NON-GOVERNMENT SALES. WORKING TOGETHER, WE SHALL SURELY BE ABLE TO LOOK BACK ON THIS DECADE AND SAY THAT THE DECISIONS TAKEN IN THE EARLY EIGHTIES WERE AS FARSIGHTED AS THOSE TAKEN IN THE SEVENTIES.





from the Minister of State  
for Science and Technology  
the Hon. John Roberts

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NOTES FOR A STATEMENT  
BY THE  
HONOURABLE JOHN ROBERTS  
MINISTER OF STATE  
FOR  
SCIENCE AND TECHNOLOGY

THE CANADIAN SPACE PROGRAM  
PLAN FOR 1981/82 - 1983/84

APRIL 9, 1981



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SPACE HAS BEEN ONE OF CANADA'S OUTSTANDING TECHNOLOGICAL SUCCESSES. I AM PLEASED TO ANNOUNCE TODAY AN EXPANSION AND DIVERSIFICATION OF THE SPACE PROGRAM THAT BUILDS ON THESE ACHIEVEMENTS.

THE GOVERNMENT HAS APPROVED A THREE-YEAR PLAN FOR NEW SPACE PROJECTS TO START THIS YEAR AND HAS ALLOCATED A TOTAL OF \$64 MILLION FOR THE PERIOD 1981/82 TO 1983/84 FOR THIS PURPOSE. THE \$64 MILLION ALLOCATION BRINGS THE TOTAL FEDERAL EXPENDITURES FOR SPACE FOR THE NEXT THREE YEARS TO \$260 MILLION.

THIS INCREASED EXPENDITURE ON SPACE IS A PART OF THE GOVERNMENT'S EFFORT TO ENHANCE THE R&D CAPACITY OF THE COUNTRY AND IN PARTICULAR INDUSTRIAL R&D. ABOUT 80 PER CENT OF THIS INCREASE FOR SPACE WILL GO TO CANADIAN INDUSTRY. THE INDUSTRIAL WORK WILL BE PLACED BROADLY ACROSS CANADA IN QUEBEC, ONTARIO, MANITOBA, SASKATCHEWAN AND BRITISH COLUMBIA.

THE SPACE PLAN HAS THREE IMPORTANT NEW THRUSTS; FIRST, IT GIVES HIGH PRIORITY TO TECHNOLOGY DEVELOPMENT IN INDUSTRY; SECOND, IT GIVES EMPHASIS TO THE POTENTIAL OF REMOTE SENSING IN RESOURCE MANAGEMENT AND SURVEILLANCE AND THUS DIVERSIFIES CANADA'S CAPACITY TO USE SPACE; AND THIRD, IT INTRODUCES AN INTEGRATED, MULTI-YEAR APPROACH TO THE FINANCING OF THE SPACE PROGRAM.

THE PLAN HAS BEEN DEVELOPED THROUGH EXTENSIVE GOVERNMENT/INDUSTRY CONSULTATIONS AND REFLECTS THE PARTNERSHIP THAT HAS EVOLVED OVER THE YEARS. FOR EXAMPLE, INDUSTRY REQUESTED INCREASED EMPHASIS ON

TECHNOLOGY DEVELOPMENT AND THE PLAN RESPONDS TO THIS PROPOSAL.  
MORE THAN 30% OF THE NEW ALLOCATION IS FOR TECHNOLOGY DEVELOPMENT.

INDUSTRY ALSO EXPRESSED AN INTEREST IN BROADENING ITS ACTIVITIES  
BEYOND THE TRADITIONAL AREA OF COMMUNICATIONS. MORE THAN 60% OF  
THE INCREASE IS IN THE REMOTE SENSING AREA.

I WOULD NOW LIKE TO HIGHLIGHT SOME OF THE MAJOR PROJECTS INCLUDED  
IN THE PLAN. IN THE AREA OF REMOTE SENSING THERE ARE SIX PROJECTS  
WITH A THREE YEAR ALLOCATION OF JUST OVER \$40 MILLION. THE PURPOSE  
OF THESE PROJECTS IS TWO FOLD. FIRST, THERE ARE THE PROJECTS AIMED  
AT IMPROVING OUR ABILITY TO USE REMOTE SENSING SATELLITES FOR  
RESOURCE MANAGEMENT.

THESE INCLUDE:

- A \$14 MILLION PROJECT TO IMPROVE CANADA'S TWO LANDSAT  
EARTH STATIONS AT PRINCE ALBERT AND SHOE COVE SO THAT  
WE CAN PRODUCE HIGH RESOLUTION DATA AND PICTURES OF  
THE LAND AND COASTAL WATERS OF CANADA. THE BENEFITS  
TO CANADIAN USERS OF THIS BETTER INFORMATION IS  
ESTIMATED TO BE \$40 TO \$60 MILLION ANNUALLY. THE  
PROJECT WILL ALSO HELP CANADIAN INDUSTRY MAINTAIN ITS  
WORLD-WIDE LEADERSHIP IN THE SUPPLY OF LANDSAT EARTH  
STATIONS.



- A TECHNOLOGY TRANSFER PROGRAM TO ASSIST RESOURCE MANAGEMENT AGENCIES TO INCORPORATE REMOTELY SENSED DATA INTO THEIR MANAGEMENT SYSTEMS
- A \$3 MILLION METEOROLOGICAL SATELLITE R&D PROJECT TO IMPROVE THE ACCURACY OF WEATHER AND ICE FORECASTS.

THE SECOND PURPOSE OF THE REMOTE SENSING PROJECTS IS TO EXPLORE THE APPLICATION OF NEW SENSORS FOR MEETING SOME OF OUR TERRITORIAL AND ENVIRONMENTAL SURVEILLANCE REQUIREMENTS. THESE INCLUDE:

- A \$17 MILLION RADAR SATELLITE PRELIMINARY DEVELOPMENT PROGRAM WHICH COULD LEAD TO THE PROVISION OF A REMOTE SENSING SATELLITE USING A NEW SENSOR WHICH WOULD PROVIDE DAY AND NIGHT ALL-WEATHER INFORMATION ON LAND AND SEA CONDITIONS. SUCH A SATELLITE SYSTEM WOULD BE PARTICULARLY IMPORTANT IN THE PROVISION OF ICE AND SEA STATE INFORMATION REQUIRED FOR SAFE, EFFICIENT NAVIGATION IN ICE-INFESTED ARCTIC AND COASTAL WATERWAYS.
- CONTINUATION OF OUR PARTICIPATION IN THE REMOTE SENSING PROGRAM OF THE EUROPEAN SPACE AGENCY IN ORDER TO ENSURE CANADA HAS ACCESS TO THE DATA FROM THE PLANNED EUROPEAN REMOTE SENSING SATELLITES.

- A \$1 MILLION STUDY OF A NEW SENSOR TO MEASURE, FROM A SATELLITE, CHLOROPHYLL CONCENTRATIONS IN LARGE BODIES OF WATER. THE INFORMATION FROM THIS SENSOR WILL HELP IN PREDICTING THE TYPE, SIZE AND LOCATION OF FISH STOCKS - A CLEAR ADVANTAGE TO THE FISHING INDUSTRY.

THE TECHNOLOGY DEVELOPMENT PROGRAM HAS BEEN SIGNIFICANTLY AUGMENTED FROM ITS CURRENT LEVEL OF \$2 MILLION A YEAR BY THE ALLOCATION OF \$20 MILLION OVER THE NEXT THREE YEARS. NEW PROJECTS INCLUDE:

- A \$3 MILLION CONTRIBUTION TO THE EUROPEAN SPACE AGENCY TO ALLOW CANADIAN INDUSTRY TO CONTINUE ITS PARTICIPATION IN THE PRELIMINARY DEVELOPMENT PHASE OF THE EUROPEAN LARGE COMMUNICATIONS SATELLITE PROGRAM. THIS PHASE WILL BE OVER THIS SUMMER AT WHICH TIME CANADA AND ALL OTHER NATIONS PARTICIPATING IN THE PROGRAM WILL DECIDE WHETHER OR NOT TO CONTINUE PARTICIPATION IN THE DESIGN AND MANUFACTURING PHASE. SHOULD CANADA DECIDE TO CONTINUE PARTICIPATION IN THESE PHASES, AN ADDITIONAL \$90 MILLION WOULD BE REQUIRED OVER THE NEXT DECADE.
- A \$6 MILLION KEY TECHNOLOGY PROGRAM FOR INDUSTRY.
- A \$10 MILLION AUGMENTATION OF THE INDUSTRIAL CONTRACT FUND OF THE DEPARTMENT OF COMMUNICATIONS.

- A \$1 MILLION PROJECT TO ESTABLISH A CANADIAN MANUFACTURER OF GALLIUM ARSENIDE DEVICES, A KEY SEMI-CONDUCTOR TECHNOLOGY REQUIRED FOR THE NEXT GENERATION OF SATELLITES AND EARTH STATIONS.

THERE ARE THREE MAJOR NEW PROJECTS IN THE AREA OF COMMUNICATIONS.  
THESE ARE:

- A \$1.5 MILLION STUDY OF A POSSIBLE DIRECT BROADCASTING SATELLITE SYSTEM. THESE STUDIES ARE ESSENTIAL TO PERMIT CANADA TO DEVELOP ITS POSITION FOR AN 1983 INTERNATIONAL CONFERENCE THAT WILL ALLOCATE THE SCARCE RESOURCES OF SATELLITE RADIO FREQUENCY SPECTRUM AND ORBIT POSITIONS.
- ADDITIONAL PERSONNEL RESOURCES TO MANAGE AND CONDUCT AN INCREASED TECHNOLOGY DEVELOPMENT PROGRAM AND TO INVESTIGATE NEW SATELLITE APPLICATIONS.
- A \$0.5 MILLION PROGRAM TO IMPROVE THE CONTROLS LABORATORY OF THE DEPARTMENT OF COMMUNICATIONS.

A FEW OF THESE NEW SPACE INITIATIVES AND SOME OF OUR EXISTING SPACE PROGRAMS ARE, OR ARE INTENDED TO BE, COOPERATIVE VENTURES WITH NASA. RECENT PROPOSED CUTS IN NASA'S BUDGET MAY AFFECT OUR PLANS. IT IS, HOWEVER, TOO EARLY TO KNOW EXACTLY WHAT THE IMPACT WILL BE

SINCE NASA IS STILL REVIEWING ITS PRIORITIES AND ALLOCATIONS. SOME CHANGES TO THE SPACE PROGRAM MAY BE NECESSARY.

AS I HAVE INDICATED, ONE OF THE MAJOR NEW THRUSTS IS REMOTE SENSING LEADING TO A POSSIBLE RADAR SATELLITE IN THE FUTURE. PLANNING IS ALSO UNDERWAY FOR A MOBILE COMMUNICATIONS SATELLITE. ONCE THE STUDIES FOR THESE TWO SATELLITE SYSTEMS ARE COMPLETED AND THEIR TECHNICAL AND ECONOMIC FEASIBILITY DETERMINED, THE GOVERNMENT WILL CONSIDER THEIR IMPLEMENTATION. SHOULD IT GO AHEAD, THE GOVERNMENT WOULD HAVE TO PHASE THE TWO PROGRAMS CAREFULLY IN ORDER TO ASSURE THE GREATEST POSSIBLE BENEFIT TO INDUSTRY AS WELL AS TO THE USERS. SIMILARLY, SHOULD THE EUROPEAN SPACE AGENCY DECIDE TO GO AHEAD WITH L-SAT, AND IF THE GOVERNMENT SAW SUBSTANTIAL BENEFITS IN CONTINUING IN THE PROGRAM, THIS WILL ALSO BECOME AN IMPORTANT FACTOR IN DETERMINING THE SIZE AND CHARACTER OF THE SPACE PROGRAM.

I BELIEVE THAT THE SPACE PLAN THAT I HAVE ANNOUNCED TODAY REPRESENTS A FURTHER IMPORTANT STEP IN THE EVOLUTION OF CANADA'S SPACE PROGRAM. FOR THE FIRST TIME, THE GOVERNMENT HAS MADE DECISIONS ON RESOURCE ALLOCATIONS ON THE BASIS OF A LONG TERM PLAN OVER THE WHOLE OF OUR SPACE INTERESTS. IT HAS ALSO ALLOCATED SIGNIFICANT RESOURCES TO MAINTAIN THE MOMENTUM OF THE PROGRAM. FEASIBILITY STUDIES OF MAJOR NEW USES OF SPACE ARE UNDERWAY. THE OUTLOOK IS VERY ENCOURAGING. WITH THESE INITIATIVES, I AM CONFIDENT THAT CANADA WILL BE ABLE TO MAINTAIN ITS PLACE IN THE VERY SMALL CADRE OF NATIONS IN THE WORLD THAT CAN INFLUENCE THE DEVELOPMENT AND USE OF SPACE FOR THE BETTERMENT OF MANKIND.



YOU WILL RECALL THAT IN MARCH I INDICATED THAT THE GOVERNMENT OF CANADA HAD INCREASED ITS EXPENDITURES ON R&D IN 1980/81 BY \$197 MILLION AND WE EXPECTED EXPENDITURES IN 1981/82 TO INCREASE BY \$216 MILLION. BOTH THESE FIGURES ARE HIGHER THAN THE AMOUNT REQUIRED BY THE GOVERNMENT TO MEET ITS SHARE OF THE R&D EXPENDITURE TARGET UNDER THE PLANNING FRAMEWORK PUBLISHED IN JANUARY.

TODAY'S ANNOUNCEMENT PLUS THE PREVIOUSLY ANNOUNCED INCREASES BRING THE TOTAL ESTIMATED EXPENDITURES TO \$248 MILLION ABOVE LAST YEAR'S. THE PLANNING FRAMEWORK CALLED FOR AN INCREASE OF \$211 MILLION IN 1981/82.





Minister of State

Science and Technology  
Canada

The Hon. John Roberts

Ministre d'État

Sciences et Technologie  
Canada

L'hon. John Roberts

# Speech Discours

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## PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY

NOTES FOR A SPEECH BY

THE HONOURABLE JOHN ROBERTS

MINISTER OF STATE FOR SCIENCE AND TECHNOLOGY

TO THE SYMPOSIUM OF

THE CANADIAN SCIENCE WRITERS' ASSOCIATION

OTTAWA, ONTARIO

30 NOVEMBER 1981



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LADIES AND GENTLEMEN:

TWO WEEKS AGO, AN EVENT TOOK PLACE WHICH PROBABLY DID MORE TO ENHANCE PUBLIC AWARENESS OF CANADIAN TECHNOLOGY THAN ANY OTHER EVENT HAS IN THE HISTORY OF OUR COUNTRY. I AM REFERRING TO THE HISTORIC DEPLOYMENT OF THE CANADARM, CANADA'S REMOTE MANIPULATOR SYSTEM, ON THE UNITED STATES SPACE SHUTTLE 'COLUMBIA'. IT WAS A TECHNOLOGICAL MILESTONE FOR CANADA AND FOR INTERNATIONAL SPACE TECHNOLOGY. YOU HAVE PROBABLY REACHED THE SATURATION POINT WITH INFORMATION ON THAT EVENT. AND THERE IS NO NEED FOR ME TO POINT OUT THE IMPLICATIONS OF THE CANADARM WHEN YOU HAVE ALREADY DIAGNOSED THEM AS WELL AS YOU HAVE YOURSELVES.

THE SUCCESS OF THE CANADARM WILL HELP TO STIMULATE GREATER INTEREST BY CANADIANS IN THE TECHNOLOGY OF OUR COUNTRY. IT WILL GO A LONG WAY TO RECTIFYING THE MISCONCEPTION, THAT I BELIEVE IS PREVALENT AMONG MANY CANADIANS, THAT WE ARE A TECHNOLOGICALLY BACKWARD COUNTRY AND OUT OF THE WORLD-CLASS PICTURE. BUT EVEN THIS EVENT CANNOT BE RELIED UPON TO REVOLUTIONIZE THE AVERAGE CANADIAN'S VIEW OF OUR POTENTIAL IN SCIENCE AND TECHNOLOGY. THERE IS A WIDELY-SUPPORTED VIEW THAT CANADA SHOULD NOT BE IN THE HIGH-TECHNOLOGY BUSINESS, AS IT IS INCAPABLE OF PRODUCING WORLD-CLASS TECHNOLOGY. WE ARE TOLD THAT WHATEVER TECHNOLOGY WE DEVELOP IS SATISFACTORY ONLY FOR OUR OWN LIMITED NEEDS. WE ARE TOLD THAT OUR TECHNOLOGY IS PERIPHERAL, THAT IT IS NOT KEY TECHNOLOGY, THAT IT IS INCREMENTAL, THAT IT IS NO QUANTUM LEAP IN ADVANCED RESEARCH, THAT IT IS NOT COMPETITIVE. THE INCREDIBLE THING IS THAT WE ARE TOLD THIS NOT BY AMERICANS, NOT BY JAPANESE, NOT BY EUROPEANS, BUT BY CANADIANS!

THEY COULD NOT BE MORE WRONG. CANADA HAS KEY TECHNOLOGICAL ACCOMPLISHMENTS IN VITURALLY EVERY SECTOR CRITICAL TO US, AS YOU NO DOUBT ARE AWARE. THE LIST, AND I WILL NOT ELABORATE AT LENGTH, IS A FORMIDABLE ONE. IN AVIATION, WE HAVE THE CANADIAR CHALLENGER AND THE DASH-8, TWO AIRCRAFT WHICH ARE WIDELY ACKNOWLEDGED AS THE CLEAR WORLD LEADERS IN THEIR OWN FIELDS. IN BIOTECHNOLOGY, WE HAVE PIONEERED LEADING TECHNIQUES IN THE PRODUCTION OF ARTIFICIAL INSULIN, AND IN GENETIC RESEARCH. IN MICROELECTRONICS -- SWITCHING TELECOMMUNICATIONS SYSTEMS, FIBRE OPTICS, ADVANCED LASER RESEARCH AND TECHNOLOGY -- ALL ARE ON THE FOREFRONT. IN COMMUNICATIONS -- TELIDON. IN ALTERNATIVE ENERGY -- REVOLUTIONARY WIND TURBINE TECHNOLOGY. AND THE LIST GOES ON.

DISPELLING THIS AND OTHER BASIC MISCONCEPTIONS WILL BE KEY TO IMPROVING THE PUBLIC'S AWARENESS AND UNDERSTANDING OF SCIENCE. I WOULD LIKE TO CONCENTRATE MY THOUGHTS ON THIS SUBJECT ON THREE BASIC PROPOSITIONS AND THEN, BY WAY OF CLOSING, BRING YOU UP TO DATE ON THE PROGRESS WITH OUR EFFORTS IN GOVERNMENT TO ADDRESS THIS SUBJECT. FIRST, I WOULD PROPOSE THAT THE DEMYSTIFICATION OF SCIENCE IS BECOMING INCREASINGLY DIFFICULT YET IMPORTANT TO AN IMPROVED PUBLIC UNDERSTANDING OF SCIENCE AND ITS ROLE IN OUR SOCIETY. SECOND, PUBLIC AWARENESS OF SCIENCE IS IMPORTANT FOR THE SPECIFIC OBJECTIVES OF REALIZING OUR TECHNOLOGICAL POTENTIAL IN THIS COUNTRY AND ENSURING THAT THIS POTENTIAL IS USED EFFECTIVELY TO ACHIEVE OUR HIGHEST NATIONAL PRIORITIES. AND THIRD, THE RESPONSIBILITY AND SUCCESS FOR IMPROVED PUBLIC AWARENESS IN THIS COUNTRY OF SCIENCE AND TECHNOLOGY WILL ULTIMATELY DEPEND UPON OUR SCIENTIFIC COMMUNITY; AND BY THAT I MEAN IN PARTICULAR THE SCIENTIST, THE TECHNOLOGIST, AND ESPECIALLY, THE SCIENCE MEDIA.

ON THE FIRST POINT, MOST WOULD SAY THAT THE PUBLIC'S INTEREST IN SCIENCE HAS BEEN INCREASING ON THE WHOLE. YET IT REMAINS PUZZLING THAT THIS INTEREST IS NOT HIGHER STILL.

WHY IS PUBLIC AWARENESS OF SCIENCE IN THIS COUNTRY NOT WHAT IT SHOULD, OR COULD BE, FOR THAT MATTER? PART OF THE EXPLANATION, I SUGGEST, LIES IN CONDITIONS THAT ARE UNIQUE TO THIS COUNTRY. THERE IS AN INCONSISTENCY BETWEEN THE ACTUAL SCIENTIFIC ENVIRONMENT IN CANADA, AND THE PUBLIC'S AWARENESS OF THAT ENVIRONMENT, WHICH STEMS FROM THE PARTICULAR WAY IN WHICH TECHNOLOGY HAS BEEN DEVELOPED IN CANADA OVER THE LAST THREE DECADES. CANADA HAS TRADITIONALLY IMPORTED MOST OF ITS TECHNOLOGY. THIS HAS SERVED US WELL IN THE PAST, BUT IT HAS BROUGHT WITH IT CERTAIN DEFICIENCIES WHICH HAVE HAD TO BE CORRECTED. THE MOST OBVIOUS OF THESE EFFECTS HAVE BEEN THE LIMITATION OF OUR EXPORT ABILITIES, AN OVER-DEPENDENCE ON THE EXPERTISE OF OTHER COUNTRIES, AND A LESSENING OF RESEARCH OPPORTUNITIES FOR OUR HIGHLY-QUALIFIED MANPOWER. THE MORE SUBTLE, BUT EQUALLY UNFORTUNATE EFFECT, HAS BEEN THE DISCOURAGING OF PUBLIC AWARENESS IN SCIENCE AND TECHNOLOGY.

ANOTHER PART OF THE EXPLANATION FOR UNDERDEVELOPED PUBLIC AWARENESS IN CANADA CLEARLY STEMS FROM THE SHEER VELOCITY OF TECHNOLOGICAL CHANGE IN OUR MODERN SOCIETY, AS IN ALL WESTERN SOCIETIES. THE NEW MICROELECTRONIC TECHNOLOGY HAS INDEED BEEN REVOLUTIONARY. IT DOES MAKE INFORMATION MUCH MORE AVAILABLE TO THE MAN ON THE STREET. BUT THAT TECHNOLOGY MAY HAVE ACTUALLY COMPOUNDED THE PROBLEM OF PUBLIC AWARENESS. AS THE THINK-TANKS COUNSELLED US OVER A DECADE AGO ON THE LIKELY EFFECTS OF THIS TECHNOLOGY, THE CONSUMER HAS BEEN FLOODED IN AN ELECTRONIC TIDAL WAVE OF DETAIL. THE PUBLIC HAS HAD LITTLE TIME TO ADJUST AND IS STRUGGLING AND SEARCHING FOR A WAY TO COPE. IT IS LITTLE WONDER THAT THE MAN ON THE STREET HAS HAD DIFFICULTY IN RETAINING SIGHT OF THE BASIC ISSUES IN QUESTION IN SCIENCE AND TECHNOLOGY.



BUT THESE ARE STILL, AT BEST, ONLY PARTIAL EXPLANATIONS. THE LOW LEVEL OF PUBLIC AWARENESS CAN FUNDAMENTALLY BE TRACED TO THREE OFTEN HEARD VIEWS. THEY ARE THE VERY ROOT OF THE PROBLEM. THE INDIVIDUAL OFTEN SAYS THAT SCIENCE DOESN'T DIRECTLY AFFECT HIM, AND THEREFORE HE SHOULD NOT HAVE TO BE CONCERNED ABOUT IT. SECOND, EVEN IF THE INDIVIDUAL ACKNOWLEDGES THAT SCIENCE AFFECTS HIM AS OTHER INDIVIDUALS, HE MAINTAINS THAT SCIENCE IS TOO COMPLEX AND THAT HE CAN'T UNDERSTAND IT. AND THIRD, EVEN IF ONE ACKNOWLEDGES THAT SCIENCE DOES AFFECT INDIVIDUALS AND THAT THEY ARE CAPABLE OF SOME BASIC UNDERSTANDING OF SCIENCE, THE ARGUMENT IS HEARD THAT PEOPLE CERTAINLY CAN'T INFLUENCE, IN ANY MEANINGFUL WAY, THE DIRECTION OF SCIENCE AS IT AFFECTS THEM. IT IS, I SUGGEST, ONLY WHEN THESE THREE VIEWS ARE ADDRESSED THAT WE WILL REALLY BE ABLE TO MAKE ANY SUBSTANTIAL HEADWAY IN IMPROVING CANADIAN PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY.

MY SECOND POINT THAT I WANTED TO TALK ABOUT FOR A FEW MINUTES WAS THAT AS MUCH AS PUBLIC AWARENESS OF SCIENCE IS IMPORTANT IN ITSELF, IT IS EVEN MORE IMPORTANT TO THE REALIZATION OF CANADA'S TECHNOLOGICAL POTENTIAL AND TO GET ITS MAXIMUM VALUE FOR OUR ECONOMIC AND SOCIAL OBJECTIVES IN THE 80'S AND 90'S. IN A NEW WORLD ORDER CHARACTERIZED BY DEPRESSED WORLD DEMAND, INTERNATIONAL PROTECTIONISM, LIMITED INTERNATIONAL INVESTMENT AND GLOBAL INFLATION, TECHNOLOGY MAY LITERALLY MEAN THE DIFFERENCE BETWEEN ECONOMIC LIFE AND DEATH. NO ONE WOULD ARGUE THAT TECHNOLOGY IS A PANACEA FOR ALL ECONOMIC ILLS. IT IS THOSE COUNTRIES WHO DEVELOP TECHNOLOGY IN THOSE



SECTORS WHERE THEY CAN CULTIVATE A COMPARATIVE ADVANTAGE - THEY WILL BE THE COUNTRIES WHO SECURE A SOLID ECONOMIC FUTURE FOR THEMSELVES. AND IN TURN, THE VERY DEVELOPMENT AND ORIENTATION OF THE TECHNOLOGY TO WHERE IT WILL DO THE MOST GOOD FOR THE COUNTRY IS GOING TO BE DIRECTLY CONTINGENT ON THE PUBLIC'S AWARENESS OF IT. IT IS ONLY WITH THE PUBLIC'S DEMAND AND SUPPORT FOR IT THAT WE WILL HAVE THE COLLECTIVE EFFORT TO BRING IT ABOUT.

OTHER COUNTRIES ARE CERTAINLY UNDER NO ILLUSION AS TO THE NATURE OF THE BALL-GAME IN WHICH WE ARE PLAYING. JAPAN IS AN EXCELLENT EXAMPLE OF WHAT I MEAN. LACKING OTHER EXPLOITABLE RESOURCES, IT HAS SUCCESSFULLY DEVELOPED ITS TECHNOLOGICAL KNOW-HOW TO THE POINT WHERE IT IS THE TECHNOLOGICAL DAVID CHALLENGING THE U.S. GOLIATH. FOR JAPAN, TECHNOLOGY HAS BEEN THE ELIXIR OF ADAPTABILITY. TO SAY THAT THE JAPANESE PUBLIC HAS BEEN DEEPLY APPRECIATIVE OF THE BENEFITS OF TECHNOLOGY AND THE ROLE THAT IT PLAYS IN JAPANESE LIFE WOULD BE AN UNDERSTATEMENT. IT WOULD NOT, HOWEVER, BE AN UNDERSTATEMENT TO SAY THAT THIS PERCEPTION AND THE SUPPORT FOR THIS EMPHASIS ITSELF MADE THE DEVELOPMENT OF TECHNOLOGY POSSIBLE. JUST HOW HIGH THE STAKES ARE IN ALL OF THIS IS REFLECTED IN THE U.S. ELEVENTH HOUR DECISION TO PUT THE U.S. STARS AND STRIPES ON THE CARGO PALETTE OF THE U.S. SPACE SHUTTLE SO AS TO ENSURE THAT AMERICANS UNDERSTOOD THE IMPORTANCE OF THE PRIMACY OF THE U.S. TECHNOLOGY, AT THE SAME TIME THAT THEY WERE WATCHING THE SHUTTLE'S REMOTE MANIPULATOR SYSTEM, EMBLAZONED WITH A CANADA WORD MARK, GO THROUGH ITS PACES.

I WOULD LIKE TO TURN BRIEFLY NOW TO MY FINAL POINT THAT THE SCIENTIFIC COMMUNITY ITSELF WILL BE LARGELY RESPONSIBLE FOR THIS IMPROVED PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY. IN ESSENCE, I BELIEVE THAT IT IS THE SCIENTIFIC COMMUNITY THAT MUST CONVINCE THE PUBLIC THAT SCIENCE -- AND THE ISSUES OF SCIENCE -- ARE BOTH GERMANE AND COMPREHENSIBLE; THAT SCIENCE, OR KNOWLEDGE, CAN RESPOND TO THE VALUES AND NEEDS OF OUR SOCIETY; AND THAT IT IS NOT NECESSARILY INHUMANE, OR THREATENING, NOR BEYOND THE CONTROL OF SOCIETY'S PURPOSES; BUT THAT IT WILL RESPOND TO THE DIRECTION AN INTELLIGENT SOCIETY GIVES TO IT. SCIENTISTS HAVE AN OBLIGATION NOT AS SCIENTISTS, BUT AS CITIZENS, TO EXPLORE AND TO EXPLAIN THE SOCIAL CONSEQUENCES OF WHAT IT IS THEY DO. SCIENTISTS MUST EXPLAIN -- MUST CONSIDER IT IMPORTANT TO EXPLAIN -- WHAT IT IS THEY DO AND RELATE IT TO THE SOCIAL CONTEXT OF THEIR ACTIVITIES.

I KNOW FROM MY OWN YEARS IN UNIVERSITY THE DISDAIN THAT ATTACHED TO THE WORD "POPULARISER". YET WE DESPERATELY NEED MORE PEOPLE WHO CAN TALK TO THE PUBLIC ABOUT SCIENCE, AND ITS IMPACTS, IN WAYS WHICH MAKE IT UNDERSTOOD. I SALUTE THE EFFORTS OF SOME PEOPLE IN THIS AREA -- IN CANADA FOR INSTANCE, THE CBC AND DAVID SUZUKI, THE TORONTO GLOBE AND MAIL AND ITS SCIENCE ARTICLES -- IN BRITAIN THE ECONOMIST AND ITS ATTEMPTS TO RENDER SCIENCE AND TECHNOLOGY COMPREHENSIBLE.

BUT MORE SCIENTISTS MUST GET INVOLVED IN THIS WORK OF EXPLANATION. TO BE ABSENT IS TO BE WRONG. UNLESS SCIENTISTS CARE ENOUGH TO EXPLAIN WHAT IT IS THEY DO, TO UNDERSTAND AND RESPOND TO ITS SOCIAL CONSEQUENCES,

PUBLIC SUPPORT FOR WHAT THEY DO WILL BE MINIMAL. A SCIENCE WHICH IS NOT UNDERSTOOD, WHICH DOES NOT SERVE SOCIETY AND BE SEEN TO SERVE IT, IS UNLIKELY TO RECEIVE THE KIND OF PUBLIC FINANCIAL SUPPORT WHICH IT NEEDS. THIS, TOO, IS AN AREA WHICH HAS RECEIVED SIGNIFICANT ATTENTION IN YOUR DELIBERATIONS AT THIS SEMINAR.

YOUR ROLE AS COMMUNICATORS, IN TURN, HAS BECOME EVEN MORE IMPORTANT IN LIGHT OF TECHNOLOGICAL CHANGES THAT ARE HAPPENING SO QUICKLY. WE CANNOT EXPECT OUR EDUCATION SYSTEM TO KEEP UP WITH ALL THE NEW DIRECTIONS IN SCIENCE AND TECHNOLOGY. YOU WILL BE AMONG THE FEW WHO UNDERSTAND THE IMPORTANCE OF WHAT IS HAPPENING AND WHO HAVE THE ABILITY TO COMMUNICATE THAT TO THE PUBLIC.

YOUR ASSOCIATION HAS GROWN RAPIDLY WITHIN THE LAST FEW YEARS. ALTHOUGH COMMUNICATION ACTIVITIES IN CANADA ARE OFTEN RANDOM AND UNFOCUSED, THE SITUATION WITH NEWSPAPERS AND MAGAZINES IS A NOTABLE EXCEPTION. THE FACT THAT YOUR ASSOCIATION HAS CHOSEN PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY AS THE THEME OF THIS SEMINAR INDICATES TO ME THAT IT HAS A CLEAR PERCEPTION OF THE CURRENT STATE OF AFFAIRS.

THERE ARE ENCOURAGING SIGNS THAT THE PUBLIC WANTS TO LEARN MORE. ABOUT A MONTH AGO, OTTAWA HOSTED ITS FOURTH ANNUAL SCIENCE AND ENGINEERING WEEK. ON THE LAST SUNDAY OF THE WEEK, THE HIGH-TECH COMPANIES OF OUR "SILICON VALLY NORTH" HELD OPEN-HOUSES AND OVER 10,000 PEOPLE TURNED UP TO SEE WHAT GOES ON THERE. THAT IS AN IMPRESSIVE ATTENDANCE FOR A CITY THE SIZE OF OTTAWA AND IT ILLUSTRATES THE PUBLIC'S INTEREST IN SCIENCE AND TECHNOLOGY.



FOR ITS PART, THE FEDERAL GOVERNMENT IS DETERMINED TO INCREASE PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY IN CANADA. FOR THE REASONS I MENTIONED EARLIER, THE GOVERNMENT FEELS THAT A PUBLIC UNDERSTANDING OF THE ISSUES GOES HAND IN HAND WITH OTHER EFFORTS TO PLACE CANADA AMONG THE TECHNOLOGICALLY ADVANCED NATIONS OF THE WORLD. CLEARLY, THE GOVERNMENT HAS AN OBLIGATION TO INFORM THE PUBLIC ON SCIENCE AND TECHNOLOGY ISSUES AND ON CANADA'S POLICIES IN THAT REGARD.

THE GOVERNMENT PARTICIPATES IN MANY ACTIVITIES TO INCREASE PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY. FOR EXAMPLE, THE NATIONAL RESEARCH COUNCIL PUBLISHES A BI-MONTHLY MAGAZINE CALLED SCIENCE DIMENSION WHICH IS CIRCULATED TO THE "ATTENTIVE PUBLIC" AND TO SECONDARY SCHOOLS. THE NATIONAL RESEARCH COUNCIL ALSO PRESENTS EXHIBITS AT MAJOR EVENTS AND SUPPLIES SPEAKERS FOR MEETINGS AND CONFERENCES. IN ADDITION, CERTAIN SECTIONS OF NRC ARE OPENED TO THE PUBLIC EACH YEAR. IN 1981, THE THEME WAS TRANSPORTATION, AND BOTH THE ENGINEERING DIVISION AND THE TEST AREAS AT UPLANDS WERE OPENED TO THE PUBLIC FOR THREE DAYS. ABOUT FIFTY THOUSAND PEOPLE ATTENDED.

THE NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL PROMOTES SCIENCE THROUGH ITS GRANTING FUNCTION AND SUPPORTS ACTIVITIES SUCH AS THE PUBLICATION OF THE RESULTS OF SCIENTIFIC RESEARCH AND SCIENTIFIC CONFERENCES. IN FACT, NSERC CONTRIBUTED \$25,000 TO SUPPORT THE VERY SUCCESSFUL SCIENCE AND ENGINEERING WEEK I MENTIONED EARLIER.



THE SOCIAL SCIENCES AND HUMANITIES RESEARCH COUNCIL SUPPORTS LEARNED JOURNALS AND SCIENTIFIC CONFERENCES THROUGH GRANTS. ONE OF ITS CURRENT INTERESTS IS A PROJECT WHICH YOUR ASSOCIATION HAS SET UP, FOR REGIONAL SEMINARS FOR THE MEDIA, SCIENCE SCHOLARS, MEDIA MANAGEMENT AND SCIENCE WRITERS.

THE MINISTRY OF STATE FOR SCIENCE AND TECHNOLOGY CONTRIBUTES TO THE PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY THROUGH ITS TRAVELLING EXHIBIT WHICH WAS DISPLAYED AT CONFERENCES SUCH AS THIS YEAR'S AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE MEETING IN TORONTO AND AT MAJOR EVENTS SUCH AS THE CNE. MOSST HAS ALSO CONTRIBUTED AN ANNUAL AWARD FOR EXCELLENCE IN SCIENCE WRITING TO YOUR ASSOCIATION.

THE SCIENCE COUNCIL HAS CARRIED OUT A BENCHMARK ATTITUDE STUDY ON PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY. I AM EXPECTING AN INTERDEPARTMENTAL COMMITTEE TO REPORT TO ME SHORTLY ADVISING THE GOVERNMENT AS HOW TO BEST FOLLOW UP ON ITS RECOMMENDATIONS. THE SCIENCE COUNCIL IS ALSO PREPARING A COMPARATIVE STUDY BETWEEN POLICIES AND PROGRAMS FOR PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY IN FRANCE, WEST GERMANY, THE UNITED KINGDOM AND THE NETHERLANDS, WITH REFERENCE ALSO TO THE EUROPEAN COMMUNITY AND THE OECD.

THESE ACCOMPLISHMENTS ARE IMPRESSIVE, BUT WE FEEL THAT MUCH MORE IS REQUIRED. FOR EXAMPLE, SCIENCE AND R&D POLICY AS SUCH IS NOT GENERALLY UNDERSTOOD BY THE PUBLIC. NOR IS THE PUBLIC AWARE OF THE CONSIDERABLE EFFECT OF SCIENCE AND TECHNOLOGY ON THE ECONOMIC SITUATION.

TECHNOLOGICAL OPPORTUNITIES FOR INDUSTRY AND FOR INDIVIDUALS ARE NOT WELL BROADCAST. AT THE FEDERAL LEVEL, WE ARE DETERMINED TO REMEDY THIS SITUATION. TO DATE, MOSST HAS BEEN PERCEIVED AS AN "INTERNAL ADVISOR". I AM PLANNING TO GIVE MOSST MORE PUBLIC VISIBILITY IN ORDER TO INCREASE PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY. YOUR ASSOCIATION HAS BEEN A LEADER IN PROMOTING SCIENCE AND TECHNOLOGY AND IN PROMOTING PUBLIC AWARENESS. AT THE FEDERAL LEVEL, I FEEL WE COULD LEARN MUCH FROM YOUR EXPERIENCE AND WOULD BENEFIT FROM INCREASED CONTACT WITH THE MEMBERS OF YOUR ASSOCIATION. I BELIEVE THAT WE SHARE A COMMON PURPOSE AND I BELIEVE THAT WE WILL ONLY BE STRONGER FOR PURSUING THAT PURPOSE TOGETHER.

Minister of State

Ministre d'État

Science and Technology  
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The Hon. John Roberts

L'hon. John Roberts

# Speech Discours

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NOTES FOR A STATEMENT  
BY THE  
HONOURABLE JOHN ROBERTS  
MINISTER OF STATE  
FOR  
SCIENCE AND TECHNOLOGY

THE CANADIAN SPACE PROGRAM  
PLAN FOR 1982/83 - 1984/85

DECEMBER 9, 1981

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MANY OF YOU WILL HAVE TAKEN PART IN THE COVERAGE OF THE RECENT FLIGHT OF THE U.S. SPACE SHUTTLE COLUMBIA. MILLIONS OF CANADIANS FOLLOWED ON T.V. THE PERFORMANCE OF THE CANADARM, THE REMOTE MANIPULATOR SYSTEM WHICH IS A KEY COMPONENT OF THE SHUTTLE PROGRAM.

WE HAVE BEEN WORKING FOR TWENTY YEARS TO DEVELOP THE KIND OF COMPETENCE DISPLAYED BY THE CANADARM. IT HAS PAID OFF. WE ARE NOW READY TO GO A STEP FURTHER.

THE NEED FOR ECONOMIC DEVELOPMENT AND SUSTAINED LONG-TERM GROWTH IN CANADA IS URGENT. RECOGNIZING THIS URGENCY, THE GOVERNMENT OUTLINED A MAJOR ECONOMIC DEVELOPMENT POLICY WITH THE BUDGET. THE AIM OF THAT BUDGET PAPER IS TO PROVIDE A LONG-TERM STRATEGY FOR MOBILIZING THE POTENTIAL OF CANADA. THE NEW ECONOMIC DEVELOPMENT STRATEGY WAS INTENDED AS A GUIDELINE BLUEPRINT LEADING TO CONCRETE INITIATIVES. THE DOMINATING THRUST OF THE STRATEGY IS TO CONCENTRATE CANADA'S ECONOMIC EFFORT ON THOSE HIGH-POTENTIAL SECTORS OF THE ECONOMY WHERE WE ALREADY HAVE, OR WHERE WE CAN DEVELOP, A STRONG COMPARATIVE ADVANTAGE IN THE INTERNATIONAL MARKETPLACE. ONE OF THESE KEY PRIORITY AREAS, ONE WHERE TECHNOLOGY HAS GIVEN US THE CRITICAL EDGE, IS THE SPACE SECTOR.

TODAY, AS MINISTER OF STATE FOR SCIENCE AND TECHNOLOGY AND THE MINISTER RESPONSIBLE FOR SPACE POLICY, I WANT TO TELL YOU ABOUT A SIGNIFICANT NEW EFFORT IN OUR SPACE PROGRAM. THIS EFFORT

REPRESENTS THE GOVERNMENT'S DETERMINATION NOT ONLY TO PROMOTE SPACE BUT ALSO, THROUGH THAT, TO REALIZE THE NEW STRATEGY.

THE GOVERNMENT HAS DECIDED TO SPEND AN ADDITIONAL 132.1 MILLION DOLLARS ON OUR SPACE PROGRAM FROM NOW THROUGH 1985. LET ME EMPHASIZE THAT THIS AMOUNT IS OVER AND ABOVE THE MONIES MADE AVAILABLE FOR THE PROGRAM ANNOUNCED LAST APRIL. IN TOTAL, WE ARE GOING TO SPEND 475.8 MILLION DOLLARS ON SPACE PROJECTS OVER THE NEXT FOUR YEARS. THAT IS A BIG PUSH: A 38 PERCENT INCREASE IN FUNDING. IT IS A FIRM INDICATION THAT THE GOVERNMENT IS GIVING A VERY HIGH PRIORITY TO THE SPACE PROGRAM. IT IS ALSO A REFLECTION OF OUR BELIEF THAT HIGH TECHNOLOGY IS CRUCIAL TO CANADA'S ECONOMIC DEVELOPMENT IN THE '80's.

THESE EXPENDITURES WILL HELP PLACE CANADA IN A GOOD POSITION TO COMPETE IN IMPORTANT AND RAPIDLY EXPANDING MARKETS FOR SPACE TECHNOLOGY. CURRENT ESTIMATES OF THE POTENTIAL WORLD MARKET FOR THE MOBILE AND RADAR SATELLITES OVER THE NEXT 20 YEARS ARE OVER \$15 BILLION. THE DOMESTIC MARKETS ANTICIPATED FOR THESE SATELLITE PROGRAMS, AND OTHER TELECOMMUNICATIONS AND DIRECT BROADCASTING SATELLITES, ARE OF THE ORDER OF \$4 BILLION. OUR EXPECTATION IS THAT, IF THESE MARKETS MATERIALIZE IN THIS WAY, THE CANADIAN INDUSTRIAL SHARE OF THAT COMBINED WORLD AND DOMESTIC MARKET IS CLOSE TO \$4 BILLION. THESE PROJECTIONS WOULD SUGGEST A RETURN ON OUR INITIAL INVESTMENT OF SOME 10 TO 1. THIS IS INDEPENDENT OF THE ADDITIONAL REVENUES THAT WOULD ACCRUE FROM USER CHARGES FOR THESE SATELLITE SERVICES.

IT IS ALSO CRUCIAL THAT WE PLAN OUR TECHNOLOGICAL DEVELOPMENT PROGRAMS CAREFULLY. THE NEW INITIATIVES ANNOUNCED TODAY ARE DESIGNED TO STRENGTHEN THE PRIORITY AREAS IDENTIFIED IN THE THREE YEAR PLAN I ANNOUNCED LAST APRIL. OUR REASON FOR STICKING CLOSELY TO THESE MAIN OBJECTIVES IS IMPORTANT.

CANADA'S SPACE STRATEGY BEARS REPEATING:

1. CANADA'S NATIONAL NEEDS FORM THE CORNERSTONE OF OUR SPACE PROGRAM; NEEDS, ESPECIALLY, IN COMMUNICATIONS AND REMOTE SENSING.
2. THE STRATEGY PROVIDES A BASIS FOR BUILDING A STRONG CANADIAN SPACE INDUSTRY INCLUDING THE DEVELOPMENT OF A PRIME CONTRACTOR. SPAR AEROSPACE, OUR PRIME CONTRACTOR, HAS DEMONSTRATED IT IS COMPETITIVE AND IN A GOOD POSITION TO HANDLE MOST OF OUR DOMESTIC MARKET FOR SATELLITES AND TO RESPOND TO THE INTERNATIONAL DEMAND FOR RELATED SUBSYSTEMS. SPAR'S INCREASED ACTIVITIES WILL GENERATE A NEED FOR COMPONENTS AND SUBSYSTEMS FROM CANADIAN MANUFACTURERS ACROSS THE COUNTRY. THE PRIME CONTRACTOR POLICY WILL THUS STIMULATE THE GROWTH OF THE ENTIRE SPACE INDUSTRY AND WILL BRING INCREASED EMPLOYMENT TO SEVERAL REGIONS OF THE COUNTRY. THE NEW PROGRAM IS EXPECTED TO ADD OVER 1000 NEW JOBS TO THE 2,500 ALREADY EMPLOYED BY THE CANADIAN SPACE INDUSTRY. THE GOVERNMENT EXPECTS THAT VIRTUALLY ALL THE INCREASE IN EMPLOYMENT IN SPAR ARISING FROM THIS

DECISION WILL TAKE PLACE AT SPAR'S SATELLITE MANUFACTURING PLANT IN THE MONTREAL AREA. IT ALSO EXPECTS THE PRIME CONTRACTOR TO STRENGTHEN ITS R&D AND MARKETING CAPABILITIES. DISCUSSIONS ON THESE MATTERS WITH THE PRIME CONTRACTOR ARE CONTINUING.

3. INTERNATIONAL COOPERATION IS KEY TO CANADA'S SUCCESS. IN THE PAST WE HAVE WORKED CLOSELY WITH NASA, AND JUST LAST MONTH THE WORLD WITNESSED THE SUCCESS THAT THIS KIND OF JOINT VENTURE CAN BRING. IF INDUSTRY IS TO REMAIN COMPETITIVE, WE HAVE TO INCREASE OUR PARTICIPATION AT THE INTERNATIONAL LEVEL. TODAY'S ANNOUNCEMENT WILL MAINTAIN AND BROADEN CANADIAN COLLABORATION WITH THE EUROPEAN SPACE AGENCY. I WILL BE MEETING THIS MONTH WITH THE HEADS OF NASA AND OTHER AGENCIES TO DISCUSS MUTUALLY BENEFICIAL OPPORTUNITIES FOR SPACE CO-OPERATION WITH THE UNITED STATES.
4. GOVERNMENT, INDUSTRY AND THE UNIVERSITIES MUST WORK TOGETHER NOT ONLY TO MAINTAIN OUR TECHNOLOGICAL AND INDUSTRIAL STRENGTH, BUT TO ENSURE THAT WE DO NOT FALL BEHIND IN THE INTERNATIONAL SPACE RACE. INDUSTRY'S OWN INVESTMENT IN R&D WILL BE IMPORTANT TO THE SUCCESS OF THE PROGRAM.

THESE FOUR ELEMENTS OF OUR SPACE STRATEGY ESTABLISH A FIRM BASIS FOR A DYNAMIC GROWTH INDUSTRY IN CANADA. THAT IS WHY THE INITIATIVES WE ARE ANNOUNCING TODAY ARE SO EXCITING.



YOU HAVE RECEIVED A BACKGROUND PAPER WHICH PROVIDES DETAIL ON CANADA'S SPACE PROGRAM AND ON THE ALLOCATION OF THE ADDITIONAL 132.1 MILLION DOLLARS.

I'D LIKE TO POINT OUT SOME OF THE HIGHLIGHTS.

IN THE FIELD OF COMMUNICATIONS, 17 MILLION DOLLARS HAS BEEN ALLOCATED TO PREPARE A DETAILED PROPOSAL TO DEMONSTRATE THE VIABILITY OF A MOBILE COMMUNICATIONS SATELLITE FOR CANADA. THIS SATELLITE, DUBBED THE MSAT, WILL BE PRE-OPERATIONAL AND WILL BE BUILT TO EXPLORE THE POTENTIAL OF MOBILE COMMUNICATIONS SERVICES TO SHIPS, AIRCRAFT, VEHICLES AND PORTABLE INSTALLATIONS, PARTICULARLY IN RURAL AND REMOTE AREAS. IF SUCCESSFUL, A DECISION TO MAKE IT OPERATIONAL WOULD MAKE CANADA THE FIRST COUNTRY IN THE WORLD WITH A MOBILE COMMUNICATIONS SATELLITE. THE DOMESTIC MARKET POTENTIAL IS IMPRESSIVE, AND THE EXPORT MARKET POTENTIAL IS EVEN MORE ENCOURAGING.

REMOTE SENSING IS VITAL TO OUR ARCTIC ENERGY PROJECTS AND TO SUCCESSFUL RESOURCE MANAGEMENT ACROSS CANADA. WE ALREADY HAVE UNDERWAY THE NECESSARY R&D AND PHASE A STUDIES FOR A DOMESTIC RADAR SATELLITE SYSTEM. THIS INITIATIVE I ANNOUNCED IN APRIL. WE WILL BE CONTINUING OUR PARTICIPATION IN THE DEVELOPMENT OF A EUROPEAN REMOTE SENSING SATELLITE. WE FURTHER INTEND TO IMPROVE THE QUALITY OF THE REMOTE SENSED DATA WE CURRENTLY RECEIVE FROM LANDSAT. WE HAVE ALLOCATED 10.4 MILLION DOLLARS TO THE DEVELOPMENT, WITH

INDUSTRY, OF A DATA PROCESSING SYSTEM WHICH GIVES MORE ACCURATE IMAGERY. 3.9 MILLION DOLLARS HAS BEEN SET ASIDE AS AN INITIAL EFFORT TO BETTER INTEGRATE SATELLITE AND AIRCRAFT REMOTE SENSING DATA WITH OTHER GEOGRAPHIC DATA. THE PROVINCES ALREADY MAKE WIDE USE OF REMOTE-SENSED DATA AND THESE DEVELOPMENTS SHOULD BE OF PARTICULAR INTEREST TO THEM. I WOULD ADD THAT CANADA IS A WORLD LEADER IN GROUND STATION TECHNOLOGY AND PRODUCTION WITH SUCH COMPANIES AS MacDONALD, DETTWILER AND ASSOCIATES LTD OF VANCOUVER AND SED SYSTEMS LTD OF SASKATOON. THE CURRENT SPACE PROGRAM WILL HELP US MAINTAIN OUR LEAD.

THE LSAT, OR LARGE SATELLITE PROGRAM IS AN EXCELLENT EXAMPLE OF THE KINDS OF CO-OPERATIVE VENTURES WE ARE SEEKING AT THE INTERNATIONAL LEVEL. IN FACT, THE LSAT IS THE FIRST MAJOR JOINT PROGRAM WE HAVE HAD WITH EUROPE. IT IS A DIRECT RESULT OF OUR ASSOCIATION WITH THE EUROPEAN SPACE AGENCY, AN ASSOCIATION WE PLAN TO MAINTAIN AND BROADEN. THE TOTAL COST OF OUR PARTICIPATION IN THE LSAT IS \$90 MILLION. \$68.3 MILLION OF THE ADDITIONAL FUNDS ANNOUNCED TODAY HAVE BEEN ALLOCATED TO CANADA'S PARTICIPATION THROUGH TO 1985.

THIS PARTICIPATION WILL GIVE CANADA ACCESS TO A LARGE SATELLITE PLATFORM FOR FUTURE DOMESTIC AND EXPORT PROGRAMS. IT WILL PROVIDE SALES OPPORTUNITIES FOR OUR SUBSYSTEMS AND COMPONENT INDUSTRIES. IT WILL ULTIMATELY PROVIDE A SIGNIFICANT INCREASE IN CANADIAN INDUSTRIAL ACTIVITY.

A MAJOR JOINT SPACE SCIENCE PROGRAM ANNOUNCED IN 1980 IS CURRENTLY UNDERWAY WITH NASA. SPACE SCIENCE PROVIDES US WITH A BASIC UNDERSTANDING OF THE FUNDAMENTAL NATURE OF SPACE AND IS AT THE CORE OF OUR SPACE EFFORT. IT IS ESSENTIAL FOR THE TRAINING AT OUR UNIVERSITIES OF YOUNG SCIENTISTS AND ENGINEERS WHO WILL BE TAKING JOBS IN OUR FUTURE SPACE PROGRAM.

IN INCREASING ITS FINANCIAL COMMITMENT TO CANADA'S SPACE PROGRAM, THE GOVERNMENT IS REITERATING ITS BELIEF IN THE IMPORTANCE OF SCIENCE AND TECHNOLOGY TO THE SOCIAL, CULTURAL AND ECONOMIC WELL-BEING OF THE COUNTRY; WE ARE REAFFIRMING OUR COMMITMENT TO DEVELOPING A STRONG INDUSTRIAL SECTOR IN HIGH TECHNOLOGY, SO THAT CANADA'S ECONOMIC DEVELOPMENT STRATEGY FOR THE '80'S MAY BE REALIZED. BY CONTINUING TO PLAN AND WORK TOGETHER IN ALL SECTORS - GOVERNMENT, INDUSTRY AND UNIVERSITY - WE WILL ENSURE CANADA'S STRONG POSITION IN SPACE.







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NOTES FOR A SPEECH

BY THE

HONOURABLE DONALD J. JOHNSTON

MINISTER OF STATE FOR

SCIENCE AND TECHNOLOGY

AND FOR

ECONOMIC DEVELOPMENT

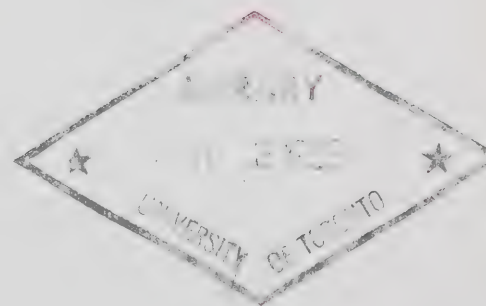
TO THE

CANADIAN INFORMATION PROCESSING SOCIETY

HOLIDAY INN HOTEL

KENT STREET, OTTAWA

MAY 19, 1983



Canada

**B&S**

working travaillons  
together ensemble

Canada



Ladies and gentlemen,

Let me first say that I am very pleased to have the opportunity to speak to you today. When I received your invitation, my imagination was piqued by your theme - "Converging Technologies" - because of the close connotation to the policy work that has occupied so many of my recent days. And I also looked forward to the challenge of finding a systematic way of explaining my thoughts on technology policy to such a systems oriented profession.

Just over two weeks ago, in the House of Commons, I was pleased to announce a Technology Policy for Canada. One of the most important issues that this policy addresses is the need to bring all the aspects of economic, industrial, social and science policies that influence, and are influenced by, technology into one manageable policy sphere.

Technology is all-pervasive; it touches each and every aspect of our lives. Any policy that addresses technology development must recognize this. It is the effective "convergence" of these related policy areas that will enable us to successfully manage technological change.

It has become almost commonplace to say we are now

experiencing a period of immense technological change -- and that our economies are facing a time of profound structural change. Such statements tend to raise the spectre of a society unable to employ all who seek employment, and this in turn can raise the accompanying spectre of citizens unable to participate in their economy and their society -- citizens reduced to a life of economic and even spiritual poverty.

This is indeed the spectre that has haunted many recent public debates.

As in most areas of economic debate, however, there are at least two schools of thought on this issue. The optimistic scenario is that technological change will not only produce more jobs, but also more lucrative jobs. This, in fact, has been our experience in the past.

If, for example, we were to look at the period between 1954 and 1982, we would see that real income per employee more than doubled while the participation rate in the workforce rose from 53% to 65%. This was an extraordinary period capable of absorbing a massive increase in the labour force while at the same time raising real income for everyone. I doubt whether anyone standing in 1954 would have imagined the achievements of these three decades.

It is this inability to visualize the professions of the future that leads other economists to suggest that we may indeed have more wealth, but we will have fewer jobs. These more pessimistic philosophers, in looking at the same period of 1954 to 1982 and seeing that the labour force would have to absorb 1 million workers leaving the agricultural labour force -- and also seeing a labour force growing at 3% per annum and a participation rate in the workforce rising from 50% to 65% -- would undoubtedly have predicted economic disorder and social upheaval.

My view is that no matter which of these scenarios is correct -- either more better paying jobs, or more wealth



but fewer jobs -- we have the means at our disposal to address these problems because society as a whole will be richer through technological development.

But let me return for a moment to the theme of convergence, because the structural adjustments which must take place over the next decade are not just the result of changes in our technological base, but flow from the convergence of at least six separate but interrelated economic streams -- a convergence which the pessimists could see as a threat of disastrous flood or a convergence which the more optimistic would see in terms of harnessable opportunities.

The six streams can be defined as;

- the ever increasing tide of inflation that has crept into every corner of the economy;

- the emergence, particularly in the newly industrialized countries, of competitive industries which have overtaken traditional Canadian industries;

- the increasing rate of labour-saving technological change in industrialized countries;

- the rapid social revolution in the industrialized countries which has led to an extraordinarily rapid rise in the proportion of the labour force seeking jobs;

- the dramatic tightening of monetary policy around the world in the early 1980's to stem the inflationary tide but which also brought on the deepest recession the world has experienced since the 1930's; and,

- the groundswell of longer-run Kondratieff-imaged patterns suggesting that many of the forces underlying the growth of the 1950's and 1960's were spent and a pause in the 1970's and 1980's was inevitable until new growth centres formed.

The current convergence of these six streams suggests to some that the 1980's will not be a period of ebullient growth -- but others, including myself, see it also as an opportunity to lay the necessary foundation for future growth. The technological revolution is proceeding -- in microelectronic controls, in information processing, in the biological sciences, in our extractive and processing industries, in our service industries -- and each of these areas provides us with the opportunity to increase productivity, to increase our prosperity.

The Technology Policy which I recently announced provides the framework from which we can, in an organized and deliberate way, recognize the opportunities before us and mobilize our interrelated policies and activities to ensure those opportunities do not pass us by.

Along with the Technology Policy announcement, I was pleased to be able to announce that the Prime Minister has established a Sub-Committee of Cabinet on Technology Development. This special Sub-Committee plays a very important role in effectively bringing together the various policy areas that influence, and are influenced by, technology development. Each Minister that sits on that Sub-Committee has the mandate to augment or change the specific policies, programs and activities which, in total, make up our technology policy. This is the first time such an approach to the management of technology development has been taken by the federal government. It is an approach which I am confident will see practical and valuable results.

The Sub-Committee's first task has been to confirm the policy directions for technology development in Canada -- which are outlined in the objectives to the Technology Policy -- and to translate these objectives into action. In fact, we have already seen some of these objectives translated into action in the Budget.

The Budget has set an important and timely precedent in earmarking over \$700 million for technology development

over the next two years. It is a precedent I am sure we have all welcomed; a precedent that highlights this government's commitment to our country's technological future.

The general objectives of the Technology Policy are, first, to strengthen the Canadian economy through the creation, application and diffusion of state-of-the-art technologies.

As a second objective, we intend to manage the process of technological development so that Canadians are aware of both the opportunities and problems that might arise.

Third, we must ensure that the benefits of technology development are shared equitably among all Canadians in every region.

And finally, we must encourage an environment within our country which stimulates scientific curiosity, innovation and technological excellence.

However, a comprehensive Technology Policy must look beyond the sphere of the federal government and take into account the contribution each sector of the economy makes to technology development. In this context, the federal government has set some detailed objectives for itself which relate to its interactions with the other sectors.

I do not want to use up all my time with you detailing these many specific objectives, but I would like highlight some which relate quite directly to the business environment within which the information processing industry operates.

The specific objectives relating to the business sector reflect the primacy of the private sector in initiating innovation and new investment. We must encourage an overall business environment that favours investment, innovation and enterprise.

In this regard, the Budget has made proposals for changes



in the current R&D tax incentive scheme which will significantly enhance the current R&D investment environment. Canada's tax incentives have been among the world's richest, but these proposals are aimed at making these incentives even more effective, and their application and administration simpler. Consultations with industry on these proposals are now beginning, and will be completed by July 1.

It is estimated that these proposals, if accepted by industry, would contribute a further \$100 million in industrial incentives for research and development. There is a significant enhancement to current tax benefits to industry, which, in terms of foregone revenue to the government, are already calculated to be over \$200 million for 1983. And I have not even yet mentioned the changes to the Investment Tax Credit in the April Budget, which apply to all businesses, and which likely provide R&D performers with an additional \$85 million in the first year in which they apply.

Our earlier consultations with business indicated that this was the sort of support to the business environment that they find most effective, and I am confident we will soon see their response in increased technology investment.

Another of our objectives for the business sector is to ensure current federal industrial support programs for technology development continue to effectively support industrial initiatives. Also, Canadian firms must have access to the most productive technologies available to ensure their competitive advantage and the best possible information regarding technological forecasting and assessment must be readily available.

These objectives will ensure that industry has the chance to recognize the opportunities being opened up through technological change, and has the fiscal resources to take advantage of them.

This is even more true for your industry, as it is on the



leading edge of technological change, and it will be first to see the opportunities before us. There is no question that the complex and sometimes difficult economic environment has had its effect on the information processing industry as it has on other Canadian industries. Nevertheless, there is a demand now, and it will escalate, for products and services that can help improve productivity.

Productivity growth will become as important a theme in our near future as fighting inflation has been in our recent past. Those companies and industries that come up with dynamic and innovative methods of achieving that specific goal will prosper. The current recession has brought home the necessity of running a lean, tough business in order to succeed, and productivity is central to that objective.

The information processing industries are central to our success in achieving productivity growth. Whether a company's business is in farming, mining, manufacturing, transportation or retailing, its management, marketing, distribution and other operating controls are basically office-centered, information-handling activities. As the number of blue-collar workers decreases, the proportion of white collar workers even in manufacturing organizations continues to increase. In virtually all commercial enterprises one finds executives, managers, clerks and secretaries; in most organizations there are also more specialized information workers, such as engineers, scientists, attorneys, salesmen, librarians, computer programmers and word processors. These people constitute the human-capital resources that can make an information-intensive economy viable.

It is in offices that the basic decisions are made that determine the cost-effectiveness of an entire organization. The office is the place where the timeliness of a decision or of a response can have immediate consequences. In today's competitive business environment, if the office is ineffective, the organization becomes ineffective.

The automation of office work is an essential element in the transformation of Canadian society to the so-called "information age". If new information technology is properly employed, it will enable organizations to decrease the delay and uncertainty brought about by the inaccessibility of information that is, for example, being typed, has been misfiled, or is even in the mail. It will reduce redundant work and unnecessary tasks and it will make better use of human resources for tasks that require judgement, initiative and rapid communication. It will enable faster and better decision-making that takes into account multiple, complex factors.

Your industry is in the forefront of technological change, and you are the first to see the effect of this change upon society. As I noted earlier, many people today are fearful of the new technologies and of the impact they will have on employment. Their apprehensions are valid, and the government, in cooperation with business and labour must take every possible action to ensure that the transition period to the new technologies is made with as little social upheaval as possible.

The commitment this government has made to technology and, perhaps even more importantly, to the management of technological change is evident.

Over \$700 million has been set aside in the Budget to provide support for technology development. This is in addition to the \$3 billion already budgeted in the 1983/84 estimates. It does not include the \$200 million in foregone tax revenues for current R&D expenditures, nor the \$185 million the new tax changes and proposals would add.

These funds are committed to support all aspects of technological development -- support to industry, and support for adjustment to the technological future.

We have the policy framework and we have the fiscal support. It is now up to each of us to take advantage of

the technological opportunities at hand to build a strong economic foundation for our future.





